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SCIENTIFIC INFORMATION REPORT

Electronics and Engineering

(26)

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SCIENTIFIC INFORMATION REPORT

Electronics and Engineering (26)

is presented

This is a serialized report consisting of unevaluated information prepared as abstracts, summaries, and translations from recent publications of the Sino-Soviet Bloc countries. It is issued in seven series. Of these, four, Biology and Medicine, Electronics and Engineering, Chemistry and Metallurgy, and Physics and Mathematics, are issued monthly. The fifth series, Chinese Science, is issued twice monthly; the sixth series, Organization and Administration of Soviet Science, is issued every 6 weeks; and the seventh series, Outer Mongolia, is issued sporadically. Individual items are unclassified unless otherwise indicated.

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I. ELECTRONICS

Annotated Index Selections

1. Abstracts on Radio Electronics and Radio Engineering

(Annotated Index of Literature on Radio Electronics), No 24, 1962

Following are translations of selected abstracts from the above source.

1. "Morskoy sbornik (Naval Journal), Vol 11, No 11, 1962

"V. A. Gorbunov, 'Methods of Determining the Probability of Detecting a Target in the Active Zone of the Observing Instrument,' pp 34-41, illustrated.

"The author examines methods of quantitatively determining the probability of detecting targets in the active zone of the observing instrument. Formulas are given which may be used to determine the probability of detecting a target with the aid of discrete and continuous-action devices under stable and varying conditions of observation. Results are given of an evaluation of the probability of detecting a target which is stationary relative to the observing instrument and moving in different course parameters. These methods are recommended for practical application in determining the effectiveness of means of observation on the basis of their ability to detect different targets under varying conditions. It is shown that it is then possible to determine the necessary outlay of efforts and means for the search, detection, and evaluation of the efficiency of a system.

"V. N. Sheremet'yev and others, 'A Possible Method of Calculating the Reliability of a Weapon With the Aid of Modeling,' pp 73-81, illustrated.

"A method of computing the quantitative characteristics of the reliability of systems consisting of a limited number of elements is described. In this connection, the following problems are examined: the accumulation, study, and categorization of information which characterizes the actions which influence the reliability of the system; reduction of the complex process of 'loss' of reliability of an element to a circuit which reflects the essence of the dynamic relationship between the reliability of the element and the influence of basic groups of actions; the development of a method which will make it possible, with a minimum of assumptions and simplifications, to quantitatively determine the

relationship between the reliability of an element and the basic groups of actions; and the construction of an algorithm for the solution of the reliability problem. It is shown that the most expedient method of determining the reliability of dynamic systems is that of statistical testing. An enlarged block diagram of the algorithm is given and its operation is described.

2. "Voprosy tochnosti i nadezhnosti v mashinostroyenii (Problems of Precision and Reliability in Machine Building), collection of articles; Moscow, Publishing House of the Academy of Sciences USSR, 1962

"M. I. Kochenov and V. S. Chaman, 'Inductive Measuring Instrument With a Computer,' pp 69-79, illustrated.

"A measuring device is described which is designed for the automatic measurement and calculation of the arithmetic mean of a series of measurements (from 2 to 40). The device provides for recording or readout of the corresponding commands for adjustment of the machines which are processing the controlled part. The basis of the device is a self-balancing bridge comprising a variable inductor and a slide error of no more than $\pm$0.2 micron, is described in detail. A wiring diagram and block diagram of the device are given, and the possibilities of its application for the automation of technological processes in machine building are analyzed.

Circuit Theory

2. Investigation of Wave Conversion in Wave Guides

"Methods of Experimental Investigation of Wave Conversion in Short Sections of Wave Guides," by V. V. Meriakri and R. B. Vaganov, Institute of Radio Engineering and Electronics, Academy of Sciences USSR; Moscow, Radiotekhnika i Elektronika, No 12, Dec 62, pp 1997-2002

Investigation of low-loss wave-guide lines has shown that substantial attenuation was due to conversion of the working wave into parasitic waves. Therefore, it is important to control the excitation of parasitic waves in short sections of wave guides that form a long transmission line. Such measurements permit the evaluation of the magnitude of attenuation due to transformation, as well as the separation out of the high-loss wave-guide sections.

To measure the coupling coefficient between the operating and parasitic waves, a cavity resonant for one such wave is introduced into the circuit. This investigation was concerned with measurement of H_{01} wave attenuation due to partial conversion into parsitic waves H_{12} and H_{02} at the nonuniformities of a round wave guide. The measurements were carried out with 7.9- to 8.4-mm waves for standard copper and copper-clad steel round wave guides 60 mm in diameter. The wave guides had a coating of dielectric material 90 microns thick. The steel wave guides were buried in the ground for 6 months prior to the test.

The attenuation of H_{01} waves in copper wave guides was found to be about 1.5 db/km; and in steel wave guides, 2.5 db/km.

3. Modulation Characteristics of Microwave Gas-Discharge Attenuators

"Investigation of the Modulation Respense of a Gas-Discharge Microwave Attenuator," by Ye. A/. Stakhov; Moscow, Radiotekhnika i Elektronika, No 12, Dec 62, pp 2007-2012

The interaction of a modulated plasma with a microwave field can be utilized in high-grade molulating devices operating at microwave frequencies. Such modulators are not sensitive to overloading. The quality of amplitude modulation obtained with such gas-discharge attenuators is comparable to amplitude modulation requirements of first-class radio broadcasting channels. The practical operating range of a gas-discharge attenuator with respect to power capacity is located between the conditions at the initiation of discharge and the level of instrument noises. The frequency range is limited by the time constant of plasma desay.

Experimental investigation of modulation response of gas-discharge attenuators was carried out with 3-cm weaves. The gas-discharge attenuators were filled with neon gas having a 10% admixture of argon; a pressure of 4 mm Hg was maintained at the attenuator. The wave guides had a cross section of 23 X 10 mm and were intended for the H_{10} fundamental wave.

Such microwave gas-discharge attenuators, when operating as modulators, amy be used in metering technique or in some radio engineering devices with continuous wave generation.

4. Effect of Magnetic Field on Refractive Properties of Electrestatic Lenses

"The Effect of a Magnetic Field on Refractive Properties of an Anode Lens in Electron Beam Forming Systems," by I. V. Alyamovskiy; Radiotekhnika i Elektronika, No 12, Dec 62, pp 2037-2042

The aim of this study is to calculate approximately the value of a correction to the refractive effect of an electronic lens to compensate the action of the magnetic field and to determine conditions under which the effect of the magnetic field may be neglected, so that computation of beam trajectory can be carried out according to standard electrostatic lens formulas. Such an electrostatic lens is formed by an aperture in the anode of an electron gun.

Approximate calculation was carried out to determine the change in the angle of inclination of a paraxial trajectory during its passage through an electrostatic lens placed in a rising magnetic field. It was shown that the correction to the refractive effect of an electrostatic lens, due to magnetic field, might have appreciable values under certain conditions. Such corrections generally decrease with the increase in magnetic field intensity at the cathode and the compression of flux in the electron gun up to certain values.

It was shown that the effect of the magnetic field on the refractive properties of an electronic lens can be neglected if the magnetic induction across the electron beam at the anode is about the same as at the cathode.

5. Interaction Effects in Cavity Klystron

"Interaction of Electron Flux With Electric Field in a Cavity Resonator Klystron," by G. A. Zeytlenok; Moscow, Radiotekhnika, No 12, Dec 62, pp 3-12

The problem of the interaction of electron flux with the electric field in a cavity klystron has a rigorous solution only if the H-F voltage applied to the gap is considerably smaller than the accelerating voltage. When the H-F voltage amplitude is close to that of the accelerating voltage, the problem does not have a rigorous solution and should be solved approximately by introducing a few simplified assumptions.

Equations were derived for the transit angle. Determinations were made for active and reactive components of induced current in the resonator and for active and reactive components of electronic load conductivity. The dependence of H-F voltage, the form of convection current, and the transit angle on the components of induced current and electron load conductivity are found.

It was shown that voltage at the gap influences the induced current only if the transit angle is a multiple of 2 pi and that the presence of higher harmonics in the convection current entering the gap influence only the reactive conductivity of electronic load.

6. Correction Circuit for Sagging Pulse Top in Pulse Transformers

"Computing a Circuit for Correcting Pulse Sag in Pulse Transformers," by P. N. Matkhanov and Yu. A. Petrov, Izvestiya Lengradskogo Elektrotekhnicheskogo Instituta (News of the Leningrad Electrical Engineering Institute), No 46, 1961, pp 128-133 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-7-232 1)

The sagging of the flat top of the pulse in a pulse transformer is caused by a drop of voltage across the internal resistance as a result of the growth with time of the magnetizing current I_μ. To obtain an ideally flat top of the pulse, it is necessary that the transformer be connected in parallel with a correction circuit, which will compensate the variation of I_μ. In the general case, this variation is nonlinear with respect to time and is given in the form $i_\mu(t)$. The problem of computing the correction is reduced to the choice of a two-pole which will compensate this function and which can be connected in series to inductance and shunted resistance. In the partial case (assuming the function $i_\mu(t)$ to be linear), it is possible to find the following values for the correction-circuit parameters:

$$C = \frac{0.392\tau I_\mu}{U} \qquad L = \frac{0.498\tau U}{I_\mu} \qquad R = \frac{1.02\ U}{I_\mu}$$

where τ is the duration and U the amplitude of the pulse. If, under these conditions, a certain sag of the top of the pulse is admissible, the circuit can be simplfied and reduced to an RC-circuit with the paramters

$$C = \frac{0.512\tau I_\mu}{U} \qquad \frac{0.889\ U}{I_\mu}$$

7. High-Ohmic Printed Resistors

"High-Ohmic Printed Resistors for High-Frequency Circuits," by Yu. P. Yermolayev; Kiev, Izvestiya Vysshikh Uchebnykh Zavedeniy, Radiotekhnika, No 6, Nov/Dec 62, pp 714-722

Experimental investigation was carried out to determine the effect of size and form of printed high-ohmic resistors, as well as the material of their base, on the frequency characteristics of such resistors. The printed resistors were made of a 50-micron film with a resistivity of 9 kilohms.

The investigation showed that an increase in size, i.e., the dissipating powr, of resistors at constant ratio of sides sharply decreases the maximum permissible frequency, thus making only small dimension resistors suitable for high-frequency operation. It was also shown that an increase in the width of a resistor with constant length results in an increase in the permissible frequency; however, an increase in width with constant ratio of sides reduces permissible frequency. Increase in length of the resistor at constant width leads to decrease of permissible frequency. Use of a base material with high dielectric losses also results in decrease of permissible frequency; however, this effect is not as pronounced as one due to changes in resistor geometry.

The results of this investigation may be utilized for evaluation of the frequency characteristics of a film resistor.

Communications

8. Method of Eliminating Interferences in AM Communications

"Method of Increasing Selectivity of Receivers in Case of Two AM Signals With Similar Carrier Frequencies," by Yu. N. Babanov; Moscow, Radiotekhnika, No 12, Dec 62, pp 48-51

In actual practice, it often happens that an AM radio channel experiences interference from another powerful AM channel operating practically on the same frequency. Presence of such an interfering powerful signal may greatly deteriorate reception and, insome cases, even completely disrupt it.

Systemsable to eliminate such interferences are based on the assumption that the probability of exact coincidence between the two frequencies is rather small, i.e., that the interfering carrier frequency differs by some finite value from the carrier frequency of the sending station. The interference eliminating circuit consists of a special converter stage in

which the band-pass filter is tuned to IF, while a circuit incorporating another narrow-band variable filter, a frequency doubler, and a phase-shifting unit serves to form a special local-oscillator voltage which is fed to the converter grid of the tube. Thus, with the aid of such a rather simple system of special stages it is possible to eliminate competely interference from another AM station operating on a carrier frequency near that of the sending station. When signals of an interfering station are absent, the system works as a conventional IF-amplifier, since the local-oscillator voltage on the grids of the tubes in negligible.

The proposed system does not introduce additional distortions in the received signals.

9. Color Stereotelevision

"Design of Decoding Circuits for Color Stereotelevision Receivers," by I. N. Lipay; Moscow, Elektrosvyaz', No 11, Nov 62, p 22-29

The color stereotelevision broadcasting system of the Leningrad Electrical Engineering Institute for Communications imeni Bonch-Bruyevich employs two experimentally proven new principles. These two principles can be summarized as follows: the over-all quality of the stereoscopic image is not greatly affected by lowereing within certain limits the resolution of one of the two images, and a satisfactory color stereoscopic image can be obtained even if one of the two images is reproduced only in black-and-white.

Coding of stereoscopic color information, based on the above-mentioned principle, is carried out in the following manner: One of the two stereoscopic images is scanned for brightness only and is transmitted by a single 6-Mc signal which modulates (AM) the carrier frequency, while the second stereoimage is scanned for three fundamental colors. With the aid of amplitude-phase modulation of the subcarrier, one complex signal of the color image is formed, which is placed in the free spacings of the black-and-white signal spectrum. Thus the complete signal contains all the necessary brightness information for the black-and-white receiver and for one of the three tubes of the stereoscopic color receiver, as well as chrominance information for the second tube of the color receiver.

Since the method of quadrature modulation permits simultaneous transmission on a single subcarrier of only two signals, only the chrominance signal U_y can be transmitted continuously, while the other two chrominance signals (U_{r-y} and U_{b-y}) must be transmitted sequentially in an interlace pattern.

The new system of stereoscopic color television differs from the conventional simultaneous compatible color television by the presence of sequential switching of one of the quadrature components of the subcarrier.

10. Construction of the Central House for Radioelectronics Has Started

"In the Soviet Union"; Moscow, Pravda, 24 Jan 63, p 4

Construction of a six-story building to accommodate the Central House for Radioelectronics has just begun at the intersection of Vernadskiy Prospect and Udal'tsov street in the southwest region of Moscow. Various laboratories with numerous electronic instruments and apparatus, a number of stereophonic studios for sound recording and reproduction, and as a 800-seat conference hall will be housed in this new building.

11. Color Facsimile

"Color Telegram," by I. Kirpichnikova; Leningrad, Leningradskaya Pravda, 21 Dec 62, p 4

Experimental facsimile equipment for transmission of still color images has been developed at the Television Chair of the Leningrad Electrical Engineering Institute for Communications imeni M. A. Bonch-Bruyevich. In this device, the reflected scanning beam from the color original is admitted to a system of three semitransparent mirrors, one of which reflects only red rays, the second only the blue, and the third only the green. Thus the original image is separated into three fundamental colors. Behind the mirrors are three phototubes for converting the fundamental colors into electric pulses. The receiving device is similar to the transmitting but the sequence of operations is reversed. It requires about 20 minutes to transmit a 200-mm X 300-mm color picture.

This device was developed by associates of the Television Chair -- Docent V. V. Odnol'ko, Chief Engineer A. S. Fomin, and Engineer I. A. Surikova, under the direction of Prof P. V. Shmakov.

12. Recent Soviet Patents in the Field of Communications

"Authorship Certificates"; Moscow, Elektrosvyaz', No 11, Nov 62, pp 73-74

Class 21a[1], 2. No 146753; by V. G. Lugvin and G. U. Osipenko. Telewriter Receiving Device.

Class 21a[1], 14_{01}. No 146756; by V. A. Kupriyanov. Method of Forming Phase Manipulated Oscillations in Duplex Telegrapy.

Class 21a[1], 29_{30}. No 146757; by I. I. Zhilevich. Device for Conversion of Optical Images Into a Series of Video Signals.

Class 21a[1], 32_{04}. No 146758; by V. I. Frolov. Electrostatic Method of Image Recording on Dielectric Surface.

Class 21a[1], 32_{20}. No 146759; by A. A. Antonov. Method of Obtaining Harmonic Oscillations for Constant Speed Spiral Scanning.

Class 21a[1], 32_{35}. No 146760; by A. P. Nefed'eyv. Transmitting Television Tube.

Class 21a[1], 32_{54}. No 146763; by A. G. Likiardopulo. Cathode-Ray Tube for High-Speed Pulse-Code Modulation.

Class 21a[1], 33_{01}. No 146765; by Ye. A. Rozanov, D. F. Vovchenko, and S. T. Shumskaya. Fact-Acting Semiconductor Commutator.

Class 21a[1], 34_{11}. No 146768; by V. A. Baramidze. Device for Automatic Stabilization of Beam Current in Cathode-Ray Tube.

Class 21a[1], 34_{22}. No 146769; by M. N. Tovbin. Method for Obtaining Singals of Two Adjacent Lines Simultaneously.

Class 21a[1], 34_{31}. No 146770; by G. I. Bondar'. Method for Opitcal System Design in Three-Tube Television Camera.

Class 21a[1], 36. No 146771; by I. M. Zhovtis. Blocking Oscillator.

Class 21a[1], 36. No 146772; by A. A. Polykovskiy. Device for Generating Signals With Spectrum of Given Form.

Class 21a[2], 3. No 146777; by D. L. Dubro and F. V. Semyakin. Unidirectional Capacitive Microphone.

Class 21a[2], 18_{01}. No 146779; by B. Ya. Lur'ye. Electric Current Amplifier.

Class 21a[2] 18[08]. No 146780; by V. I. Kalshnikov and A. Ya. Shpil'berg. Cathode Follower.

Class 21a[2] 18[08]. No 146781; by S. V. Kulikov, A. V. Finagin, and A. S. Chernysheva. Electric Signal Voltage Converter.

Class 21a[4], 8[02]. No 146790; M. M. Perlin. Method for Automatic Tuning of Middle Frequency to That of the Standard Frequency Oscillation in a Frequency Modulated Self-Oscillator.

Class 21a[4], 8[02]. No 146791; L. A. Korneyev. Crystal Stabilized Self-Oscillator.

Class 21a[4], 14[02]. No 146793; by B. S. Mints. Device for Automatic Maintenance of Low-Frequency Signal Level.

Class 21a[4], 22[01]. No 146794; by G. Kh. Zarezankov. Probability Filter.

Class 21a[4], 22[05]. No 146795; by I. S. Yegorov. Method for Decreasing Signal Distortion During Selective Fading.

Class 21a[4], 25[45]. No 146796; by Yu. K. Murav'yev, A. D. Istrashkin, and V. P. Serkov. Method for Determination of Antenna Directivity Coefficient.

Class 21a[4], 38. No 146801; by Ya. K. Trokhimenko. Detector Incorporating Transistor.

Class 21a[4], 42. No 146802; by M. Ye. Mazurov. Quadrature Detector.

Class 21a[4], 48[05]. No 146803; by Ya. D. Shirman. Method for Increasing Radar Resolution and the Device To Achieve It.

Class 21a[4], 48[67]. No 146804; by D. I. Mirovitskiy. Dielectric Multielement Antenna.

Class 21a[4], 48[68]. No 146806; by Yu. K. Pozhela and A. I. Vebra. Method of Obtaining Microwave Pulses With Doubling of Carrier Frequency.

Class 42g, 10[01]. No 146993; by V. I. Lazarev. Method of Magnetic Recording and Reproduction of Signals.

Class 42g, 10[01]. No 146995; by R. G. Ofengenden. Method of Pulse Amplitude Recording on Magnetic Drum.

Class 42m, 14. No 146602; by Ya. A. Raykhman, Yu. N. Buznikov, S. N. Kuplenskiy, and G. P. Lopato. Cathode-Ray Tube Storage Device.

Class 42m, 14. No 146604; by I. R. I. Puodzhyus and A. G. K. Grigas. Device for Multiplication.

Class 42m, 14. No 147025; by I. Ye. Manonov and I. Ye. Zheludev. Ferroelectric Matrix Memory Device.

Class 42m, 14. No 147031; by S. L. Chchurin and V. P. Kiselev. Ferrite Core Single-Place Adder.

Class 42m, 29. No 146607; by Sh. S. Parchuf. Number Printer.

Information Theory

13. Detection of Signals by the Binary Storage Method

"Reception of Weak Signals Using the Method of Binary Storage," by V. I. Bunimovich and V. A. Morozov; Moscow, Radiotekhnika i Elektronika, Vol 7, No 11, Nov 62, pp 1873-1879

Problems of detecting and measuring the intensity of a weak fluctuating signal by the binary storage method, which were encountered in designing equipment for the radar observation of Venus in 1961, are examined in this article. The signal represents a stationary random gaussian process in a background of stationary gaussian noise having the same shape of spectral density curve as the signal. It is concluded that:

1. The sensitivity of the receiver used to detect a weak noisy signal by the binary storage method is, for practical purposes, the same as that of a corresponding optimum receiver if a sufficiently high rate of interrogation and an optimum threshold level are used.

2. Increasing the interrogation repetition rate has the effect of decreasing the dependence of sensitivity of the method of the position of the threshold level.

Instruments and Equipment

14. New Senstive Instrument for Measuring Crystal Parameters

"Apparatus for Study of Crystals"; Riga, Sovetskaya Latviya, 25 Dec 62, p 1

A device for complex study of electric conductivity, light absorption, and luminescence in semiconductors was designed at the Latvian State University imeni P, Stuchki. All information on the above-mentioned properties of a crystal is obtained simultaneously with this device. The sample is placed in a special vacuum chamber where the temperature gradually changes from -180 to +200°C. Highly sensitive electronic instruments detect very minute currents of the order 10^{-12} amp. The device actually incorporates ten different automatic instruments are registered in parallel on four tapes.

This device is actually only a component of a more complex installation designed at the Laboratory for Semiconductor Physics.

15. Recent Soviet Patents on New Instruments

"Class 42. Measuring Instruments and Devices"; Moscow, Byulleten' Izobreteniy, No 17, Sep 62, pp 36-46

Class 42c, 41. No 149892; by B. N. Kozlov. A Device for Stabilizing the Course of a Ship, for Example, a Space Ship, in Space.

"A device is patented for stabilizing the course of a ship, for example, a space ship, in space which contains a system of mirrors and a photoelectric transducer connected to the actuating mechanisms of the control object; it is distinguished by the fact that, for the purpose of achieving independence of operation of the transducer from external sources of light, the mirrors are attached so that the beam forms a closed trajectory in which path is placed a quantum-mechanical light amplifier."

Class 42h, 3411. No 149910; by D. T. Puryayev and M. M. Krivovyaz. Interferometer for Controling the Quality of Second Order Surfaces of Rotation.

"An interferometer is patented for controlling the quality of second order surfaces of rotation, having in one arm a standard spherical mirror with its center of curvature coincident with the back focal point of the objective and in the other arm -- the controlled surface, one of

whose focal points is coincident with the back focal point of an objective which is identical to the objective in the first arm; the instrument is distinguished by the fact that, for the purpose of increasing the range of controlled surfaces, an autocollimating mirror is used whose center of curvature is coincident with the focal point of the controlled surface."

Class 42i, 10_{02}. No 149914; by G. L. Lisel'son. A Method of Measuring the Temperature of Bodies on the Basis of Their Radio Emission.

"This method of measuring the temperature of bodies on the basis of their radio emission differs by the fact that, for the purpose of determining the true temperature of 'nonblack bodies,' they are additionally irradiated by a standard radiation source and the total natural and reflected radiation is measured by means of a radiometer."

Class 42k, 9_{03}. No 149920; by B. A. Changli-Chykin, I. I. Brushteyn, V. N. Makushin, K. N. Manuylov, and M. N. Mikhaylova. Aneroil Microbarometer.

"An aneroid microbarometer is patented which contains aneroid chambers, levers, a multiplying-transmission mechanism in the form of a cylindrical spring with bidirectional widing, an indicating mirror attached to the center of the spring, and an optical readout system; the barometer is distinguished by the fact that, for the purpose of increasing its sensitivity, the rigid centers of the aneroid chambers are attached to levers by means of elastic frame supports."

Class 42k, 14_{10}. No 149924; by V. A. Novikov. Pressure Chamber for Shock Tunnel.

"A shock-tunnel pressure chamber is patented which contains a nozzle with insert, an upper electrode with a magnetic device, an eletrical igniter, and a lower electrode with a connecting air feed pipe distributed along its housing; the chamber is distinguished by the fact that, for the purpose of decreasing the time required to install the dismountable elements, it is equipped with cam-shaped grooved locks placed in the graduated openings of the housing."

Class 42m, 14. No 149951; by B. Ya. Fel'dman. A logic Element.

"A logic element is patented which consists of two parametrons with hard excitation and a frequency doubler; it is distinguished by the fact that, for the purpose of providing unidirectional propagation of information without modulation of the pumping current, the output of the first parametron is connected through the frequency, doubler to the pump input of the second, whose input is connected to the input which determines phase."

Moscow, Byulleten' Ixobreteniy, No 20, Oct 62, pp 54-71

Class 42b, 12_{03}. No 151034; by B. M. Shlyaposhnikov and Yu. A. Reznikov. Method of Thickness Determination for Nonconducting Materials.

Class 42c, 42. No 151044; by A. I. Sluskovskiy and I. S. Lev. Mixer for Seismic Prospecting Stations.

Class 42c 42. No 151046; by A. A. Marchenko; Device for Vibration Tests.

Class 42d, 10. No 151048; by Ye. P. Ugryumov. Electronic Sine-Cosine Pulse-Spectral Converter.

Class 42d, 10. No 151050; by O. S. Mendeleyev. Function Converter.

Class 42h, 21. No 151065; by R. Ya. Keymak, V. A. Shambyrov, and V. I. Kudryavtsev. Method for Automatic Measurement of Polarized Light Parameters.

Class 42k, 1_{02}. No 151072; by A. A. Stepanyan and V. M. Belousov. Converter of Shaft Mechanical Momentum Into Code.

Class 42k, 21_{02}. No 151080; by M. M. Shel', E. B. Stankevich, and V. V. Sharov. Probe for Measurement of Mechanical Stresses at the Surface of Metal Parts.

Class 42k, 46_{03}. No 151091; by N. N. Zatsepin, V. Ye. Shcherbinin, and N. M. Yexhov. Method for Defect Detection in Ferromagnetic Parts.

16. Improved Design for Film-Type Bolometers

"Film Bolometers in Heads With Fixed Tuning for Measuring Superhigh Frequency Power," by V. A. Yugov and G. A. Yugova; Moscow, Radiotekhnika i Elektronika, Vol 7, No 11, Nov 62, pp 1922-1930

The authors describe some improved types of film bolometers having good matching characteristics in a sufficiently wide frequency range without tuning. Theoretical problems of matching a film bolometer with a microwave channel are examined. The bolometers consist basically of a thin heat-sensitive palladium film, conductors for supplying feed current to the film and for connecting the film to the measuring apparatus, an area of contact between the absorbing metal film and the conductors, and a thin dielectric plate which serves as the base for the metal film and as a structural element on which the remaining part of the bolometer are mounted.

The voltage standing wave ratio of the bolometer head was found to be no worse than 1.4. Zero drift of a bridgewith a glass base bolometer did not exceed an average of 4 μ w/min at a power level of 15 mw. The parameters of the bolometer may be increased by placing it in a quartz tube of proper dimensions.

17. Measuring Wall Thickness of Cylindrical Tubing During Rolling

"Contactless Radioactivity Method of Measuring the Thickness of Thin, Vibrating Cylinder Walls," by E. B. Milevskiy, Nauchnyye Zapiski, L'vovskiy Politekhniceskiy Institut (Scientific Reports, L'vov Polytechnic Institute), No 77, 1961, pp 312-332 (from Referativnyy Zhurnal -- Avtomaticka i Radioelektronika, No 10, 1962, 10-2-78 b)

Vibrations are always present in tubes during rolling. Graphs were plotted for the effects of change of position, travel, vibration, and reduction of the cylinders on total radiation flux. On the basis of these relationships, it becomes possible to provide a dynamic compensation for the vibration, resulting in a continuously constant radiation flux to the detector at all times. In this case, the cylinder walls are penetrated on two chord lines from similar sources, the beams of which are measured by a single counter after passing through the tube. One beam, passing through the opening of the cylinder, is the measuring beam; the other, passing tangential to the mean circumference, is the compensating beam.

The theoretical basis for the method is established, and the experimental data given are in good agreement with the theory.

18. Initial Stage of Build-up To Discharge in Tube With Heater

"Build-up of Discharge From Heated Cathode During a Linear Change of Voltage," by Yu. A. Bystrov, Izvestiya Leningradskogo Elecktrotekhnicheskogo Instituta, (News of the Leningrade Electrical Engineering Institute), No 46, 1960, pp 29-41 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-3-55, s)

A study was made of the development of a discharge from a heated cathode between the cathode and grid of a hydrogen thyratron when the grid is fed a trigger pulse with a particular rise time. A theoretical examination of the processes in the initial stage lead to the following conclusions:

a. the duration of the first stage of the build-up to discharge depends quite definitely on the pulse rise time;

b. as the pressure of the filler gas is increased, the duration begins to shorten abruptly, but this shortening practically ceases after a certain pressure is reached;

c. increased length of interelectrode spacing lengthens the time of build-up to discharge.

Experimental tests with tubes in which the pressure and spacing could be regulated confirmed the above theoretical conclusions.

19. Photoresistance/Neon Lamp Combination As Photoelectronic Oscillator

"Photelectric Generator Based on Photoresistance and Neon Lamp," by V. K. Zakharov and Yu. A. Lazarev, Trudy Kazakhskogo Nauchno-issledovatel'skogo Institua Mineral Syr'ya (Proceedings of the Kazakh Scientific-Research Institute of Mineral Resources), No 3, 1960, pp 352-353 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-5-8- ts)

A description is given of a relaxation oscillator in which the capacitance is provided by a FS-K1-type photoresistance, which, together with a neon lamp, is enclosed by a light-opaque screen and positioned in such a way that all the light from the neon lamp falls on the operating portion of the photoresistance. A hole in the screen provides illumination.

The period of the oscillator depends on the voltage fed to the oscillator and on the degree of illumination of the photoresistance by an external light source. The configuration of the pulse on the electrodes of the neon lamp is almost rectangular, with slight deviation on the trailing edge. The dependencies of the oscillation frequency on the applied voltage and on the intensity of the light source are derived; they provide the possibility of using a photelectronic oscillator to measure light fluxes, particularly in the designing of apparatus for spectral analysis.

20. Semiconductor Triggers Replace Polarized Relays in Transformer Protection

"The Use of Semiconductor Triodes in Transformer Protection," by B. S. Melik-Sarkisov; Izvestiya Nauchno-issledovatel'skogo Instituta Postoyannogo Toka (News of the Scientific-Research Institute of Direct Current), No 8, 1961, pp 212-218 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-5-54, a)

For protecting the transformer bridge of a DC transmission line, a circuit is given which differs from earlier types through the use of semiconductor triggers in place of polarized relays, which provides faster action and greater reliability. A principal circuit diagram and description are given, along with oscillograms showing synchronous operation of the protective circuit and the automatic reclosure circuit.

21. Resonator for Measuring Electrical Characteristics of Delay Line

"Methods of Measuring the Electrical Characteristcs of Delay Systems in the Presence of Pronounced Space Harmonics," by L. N. Deryugin, Trudy Moskovskogo Aviatsionnogo Instituta, (Proceedings of the Moscow Aviation Institute), No 125, 1960, pp 14-34 (from Rederativnyy Zhurnal -- Avtomatika i Radioelecktronika, No 10, 1962, 10-7-272 a)

A procedure is established theoretically for measuring the delay and obstruction of communications in polyharmonic delay systems in which the amplitudes of certain harmonics are of the same order. Measurement in the traveling-wave regime involves considerable difficulty and is not very effective. Measurement in a standing-wave regime is effective in delay systems having an image-symmetrical cross section. A resonator produced by short circuiting at both ends of a section of a delay line should be arranged so that the short-circuiting obstructions are positioned in an image plane of symmetry and so that an integral number of delayed half-waves and an integral number of periods of the system are distributed along the length of the resonator. The determination of the resonance frequencies of such a resonator affords the possibility of computing the dealy of the system. The discussion also includes the question of determining the obstruction of communications by moving absorbing elements along the resonator, whereby the width of the resonance of the resonator resulting from the variation in the loss into the absorbing element will vary in keeping with the variation of the field intensity at the point of insertion of the obstructing element.

22. Standard Frequency Transmission

"Measurement of Electric Oscillation Frequency with the Aid of Radio-Transmitted Standard Frequencies," by Ye. B. Artem'yeva and G. N. Paliy; Moscow, Izmeritel'naya Tekhnika, No 10, Oct 62, pp 50-52

At present, three stations of the All-Union Scientific-Research Institute for Physicotechnical and Radio Engineering Measurements transmit standard frequencies throughout the day. The radio station PEC transmits standard frequency at 100 kc; the radio station PBM tramsmits standard frequency at 5, 10, and 15 Mc. The radio station PBM operates 0800-1500 hours (Moscow time) over telephone lines and the rest of the day over telegraph. The radio broadcasting station operates on a carrier frequency of 200 kc, which serves as a frequency standard.

The relative fluctuation of standard frequency during the day does not exceed $\pm 2 \cdot 10^{-9}$, and relative deviation from the nominal value does not exceed $\pm 5 \cdot 10^{-9}$.

The 100 kc standard frequency is received clearly on the territory of European USSR, as well as in Central Asia; the 5 Mc -- in Moscow, Kiev, Sverdlovsk, and Tbilisi. The standard frequency of 200 kc is well received in Siberia and the Far East. However, the reception of these frequencies at times is poor due to interference from foreign stations also transmitting standard frequencies.

Since during the past 10 years, prior to initiation of the described service, the Frequency Service of the USSR transmitted standard frequency only on 1,000 cps, the high-frequency consumers continue often to use this frequency for testing purposes rather than switching to the higher frequencies.

23. Boast Production of Leningrad Physics and Mechanics Technicum

"To Polar Explorers at Mirnyy and to Scientists at Hanoi"; Leningrad, Leningradskaya Pravda, 9 Jan 63

The brief article plays up the production facility of the student-production shops of the Leningrad Physicomechanical Technicum. The educational institution, situated on Chugunnaya Ulitsa, is described as producing, not one or two, but dozens and hundreds of the following devices: ultrachemiscopes used to analyze solutions, minerals in rocks, and types of glass; a medical luminescope, recommended for diagnosis of malignant tumors, and its agricultural "brother" -- for determining seed germination and the quality of food products; microfilm readers; equipment for reading cathode ray tube characteristics; and many other

"intelligent" apparatus. The production specialization of the technicum is electronic and opticomechanical instruments for luminescence analysis in ultraviolet rays. Instrument designs are worked out in a general design bureau staffed by senior students. The instruments are produced by participants in the technicum. About 8,000 instruments were produced in 1962. The instruments and equipment, built at Vyborgskaya Storona, are used in many branches of the national economy, from the food industry to the atomic industry. They are supplied to polar explorers at Mirnyy, to scientists at Hanoi, to chemists and criminologists, to geologists and biologists.

Orders for the new year are coming in to the chief engineer of the shops, V. S. Pentyurin. A shipment of instruments will be sent to Afganistan. They will be shown at an exposition in Helsinki. A new production item will soon be put out: an instrument which, by luminescence analysis, will help to reveal the presence of oil with respect to horizons and the thickness of the oil-bearing strata.

24. Bulgarians Develop Photoelectric Multiplier

"The First Bulgarian Photoelectric Multiplier Has Been Developed"; Sofia, Otechestven front, 3 Jan 63, p 2

On 2 January, specialists at the electric bulb factory in Sliven (which in 1963 is to be transformed into a center for Bulgaria's electrovacuum industry), in cooperation with the Physics Institute of the Bulgarian Academy of Sciences, successfully tested the first Bulgarian photoelectric multiplier. Modeled after the Soviet FEU-2 photoelectric multiplier, it consists of a small glass bulb with an antimony-cesium photocathode in a vacuum of 10^{-7} millimeters of mercury and has a nickel loop (ramkov) anode. Thin conductors connect the photoelectric multiplier with measuring devices which show the high efficiency with which it transforms light into electrical energy.

Materials

25. Temperature Dependence of Photo and Cathode Conductivities of Cadmium Compounds

"Temperature Dependence of the Cathode Conductivity of Cadmium Sulfide and Cadmium Selenide," by M. V. Kot; Uchennyye Zapisi. Kishinevskiy Universitet (Scientific Reports. The Kishinev University), No 49, 1961, pp 101-104 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-4-11 ts)

Methods are described and results given of a measurement of the temperature dependence of the cathode conductivity of CdS and CdSe in an electron beam of 3.0 kev and 2.10^{-8} amp; data are also given on the temperature dependence of the photoconductivity when the specimens were exposed to integral light.

CdS and CdSe crystals, obtained from the vapor phase, were attached to a glass backing with polystyrene adhesive. Thin (0.6-1.0 micron) films of CdS and CdSe were produced by the evaporation of the crystal on heated glass backing (200 deg C) at pressures not exceeding 10^{-5} mm Hg. In both cases, indium ohmic contacts were used.

It was found that, with an increase of temperature from 123 deg K to room temperature, the cathode conductivity increases gradually and steadily. In both cases, the disappearance of the cathode conductivity occurs when natural conductivity emerges. The change of protoconductivity with temperature variation is analogous to the change of cathode conductivity. Sorbed oxygen and cleanness of surface had considerable influence on the values of both cathode and photoconductivity.

26. Work Function of Thin Film of InSb Measured As 4.42 (plus-minus 0.05) Electron Volts

"Determining the Work Function of Thin Films of Indium Antimonide," by V. A. Kas'yan and N. G. Utusikova, Uchennyye Zapiski, Kishinevskiy Universitet (Scientific Reports, The Kishinev University), Vol 49, 1961, pp 112-113 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10 Zh 260)

The work function φ was determined by measuring the contact difference of the potentials V_k between a layer of InSb and a layer of Au (both decassed by heating to 300°C in high vacuum) with a pressure in the experimental apparatus of approximately 10^{-7} millimeters of mercury. The V_k values for all the measurements were 0.5 (plus-minus 0.05) volt. Assuming φ_{Au} to be 4.92 ev, this gives for InSb a value of 4.42 (plus-minus 0.05) electron volts.

27. Hall-Effect Transducers of Indium Arsenide

"The Use of Indium Arsenide for a Hall-Effect Transducer," by S. G. Tarandov, Sbornik Trudov Instituta Elektrotekhniki AN USSR (Collected Works of the Institute of Electrical Engineering, Academy of Sciences Ukrainian SSR), Vol 15, 1961, pp 58-62 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-4-45 m)

Experimentally obtained characteristics are given for a Hall-effect transducer made from InAs sheets 4 x 2 x 0.5 mm with specific resistance of 0.2 ohm/cm. In the temperature range 20-60 deg C, the relative change of resistance of the transducer did not exceed 3.6 percent of the value at 10 deg C. When the induction was changed from zero to 10^4 gauss, the relative change of resistance did not exceed 0.9.

Data are also given on the heating of the transducer by current and on the errors resulting from the potential difference of the soldered electrodes. To compare various transducers, a figure of merit and rectification factor were introduced.

It was found that Hall-effect transducers made of InAs have higher stability and lower temperature dependence of Hall potential than other semiconductor transducers of this type.

28. New Small-Size Rectifiers

"A Year of New Discoveries"; Moscow, Komsomol'skaya Pravda, 12 Jan 63, p 4

A report of Soviet mathematicians, physicists, and astronomers presented recently at the annual meeting of the Department of Physico-mathematical Sciences of the Academy of Sciences USSR states that during the past year Leningrad physicists have developed pure-crystal rectifiers which are 100, even 1,000 times smaller than that now used in power engineering.

The report also states that the work performed by physicists Gribov and Pomeranchuk has brought the scientists closer to establishing general fundamentals for the theory of elementary particles.

Radar and Navigation Aids

29. AN/FPS-50 Radar Described in Soviet Periodical

"ICBM Detection Radar Station," by A. I. Korniyenko, Moscow, Vestnik Protivovozdushnoy Oborony, Vol 9, No 9, 1962, pp 71-76 illustrated (from Annotirovannyy Ukazatel' Literatury po Radioelektronika [Annotated Index of Literature on Radio Electronics], No 23, 1962, item 11435)

"A description is given of the AN/FPS-50 radar station, one of the basic components of antimissile defense in the US, which is intended for the long-range detection of ICBMs, determination of their flight trajectory, target indication, and for determining the launch and impact of the missile. The station is capable of distinguishing between warheads and meteorites, artificial earth satellites, and aurorae. The complete cycle of operations of analysis and processing of the radar information requires no more than 10 seconds. Nonstrategic targets are screened out in less than one second. The information provided by the computer is fed to the local AN/FPS-50 indicator, to North American Air Defense headquarters, to the Strategic Air Command headquarters, and to Washington for evaluation of the situation by means of a central computer."

30. Global Rocket Complicates Defense Problem

"Spotting and Tracking Rockets," by Science Correspondent, APN; Vil'nyus, Sovetskaya Litva, 26 Dec 62

The APN science correspondent acquaints his readers with the complexity of spotting and tracking ballistic missiles with the objective of interception, from "materials in the foreign press." He reviews three methods, viz., detection of reflected energy, detection of radiated energy, and detection of disturbances in the environment in which a rocket is traveling. He mentions the application of light and radio waves to reflected energy detection methods, the application of infrared, and the detection of electromagnetic emissions from the rocket trail and notes that information on the possibilities of practical utilization of the latter has been of a very general nature. It is not likely, he says, that detection of environmental disturbances will prove adaptable as a base for systems of long-range detection.

The writer reviews in summary fashion the development of the US ballistic missile early warning system, noting that with the use of special electronic machines and modern methods of communications, there is a lapse of only 10 seconds between the moment of pickup of the rocket or satellite and the notification of the suitable control centers.

The writer points out that such stations (radar stations) operate only in a zone of direct visibility and can observe only a limited sector. Hence, he says, the US is establishing whole systems of such stations which will make it possible to observe and track rockets at a longer range.

The correspondent winds up the article with the following remarks: "The construction of these systems costs very dearly and provides no guarantee of 100-percent observation of all ballistic rockets. With the appearance of global rockets, this problem has been considerably complicated."

31. Radar Equipment Used in Venus Observations Described

"Radar Apparatus Used in Investigation of Venus in 1961," by V. A. Kotel'nikov, L. V. Apraksin, V. O. Voytov, M. G. Golubtsov, V. M. Dubrovin, N. M. Zaytsev, Ye. B. Korenberg, V. P. Minashin, V. A. Morozov, N. I. Nikitskiy, G. M. Petrov, O. N. Rzhiga, and A. M. Shakhovskiy; Moscow, Radiotekhnika i Elektronika, Vol 7, No 11, Nov 62, pp 1851-1859

The basic components and principles of operation of special radar equipment designed by the Institute of Radio Engineering and Electronics of the Academy of Sciences USSR and a number of other organizations for the purpose of investigating the planet Venus in 1961 are briefly described. Observations were carried out from 18 through 26 April 1961.

Transmitter frequency was approximately 700 Mc, power density was 250 Mw per steradian, and coverage of the entire surface of the planet was approximately 15 2. The radiated waves were circularly polarized and were received by a linearily polarized antenna to eliminate the effect of rotation of the polarization plane on the incoming signal level.

The radiated signal was in the form of telegraph pulses with a spacing duration of 128 or 64 msec (AM). A sequence of telegraph signals at two frequencies, separated by 420 c and each having a duration of 64 msec (FM), was also used. Transmitter and gating frequency, and the frequency of the receiver heterodynes were controlled by a precision quartz oscillator with a stability greater than 10^{-9}.

The method used for analysis of the reflected signals is examined in detail, and the sequence of operations performed by the timer is explained with the aid of a block diagram.

Results of the processing of data obtained during these tests are published on pages 1860-1872 of this periodical.

32. Signal Analyzer Used in Venus Observations Described

"Weak-Signal Analyzer Used inRadar Observations of Venus in 1961," by V. A. Morozov and Z. G. Trunova; Moscow, Radiotekhnika i Elektronika, Vol 7, No 11, Nov 62, pp 1880-1889

The multichannel signal analyzer used in radar observations of Venus in 1961 for the purpose of determining spectrum structure, intensity, and delay of weak signals is described. Both the wide-band and narrow-band components of the reflected signal were studied with slightly modified versions of the analyzer, each of which is examined in the article. Sensitivity of the analyzer ("threshold" signal-to-noise ratio at the input of one channel of the analyzer) was between 0.013 and 0.015.

33. Results of Radar Observations of Venus

"Results of the Radar Observation of Venus in 1961," by V. A. Kotel'nikov, V. M. Dubrovin, V. A. Morozov, G. M. Petrov, O. N. Rzhiga, Z. G. Trunova, and A. M. Shakhovskiy; Moscow, Radiotekhnika i Elektronika, Vol 7, No 11, Nov 62, pp 1860-1872

This article presents the results of an analysis of the radar signal spectrum obtained during radar observations of Venus in April 1961. The analysis showed that the spectrum may be represented as the sum of a narrow-band and a wide-band component. (The authors explain that the wide-band component is formed as a result of the reflection of the signal from the entire surface of the planet and by a Doppler frequency shift caused by its rotation; the narrow-band component is caused by a reflection from the near portion of the planet's surface -- a "bright point.") Graphs of the spectra of each of these components are given.

The following results were obtained:

1. The astronomical unit is equal to 149,599,300 km with a maximum error of ±2,000 km.

2. The width of the narrow-band component was less than 4 cycles, and its intensity was almost unchanged during the entire 9 days of observation. The reflection factor for Venus, determined from the narrow-band component, was equal to 8% (of an ideally conducting sphere of the same dimensions).

3. The wide-band component of the signal corresponded to an expansion of lines to 400 cycles or more; the component varied greatly from one day to the next. The energy of the wide-band component was commensurate with that of the narrow-band component.

34. Hints on Maintenance of Neptune Radar

"Technical Maintenance of a 'Neptune' Radar Station," by M. M. Beygman, Informatsionnyy Sbornik. Tsentral'nyy Nauchno-issledovatel'skiy Institute Morskogo Flota (Collected Information. The Central Scientific-Research Institute of the Maritime Fleet), No 70, 1961, pp 3-9 (from Referativnyh Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-7-126 ye)

Recommendations are made on the basis of practical use and experience in avoiding apparatus failure. Advice is given on testing the condition of the antenna--wave-guide assemly, the transceiver section, and the display. A description is given of certain indications of conditions whereby the equipment is not completely out of order but in a state where operation is considerably impared. The importance of periodic examinations and the lubrication of moving parts is emphasized.

35. Check on Accuracy of Decca System in Gulf of Finland and Gulf of Riga

"The Accuracy of Position Finding With the Decca System," by V. M. Pravdyuk, Trudy Tsentral'nogo Nauchno-issledovatel'skogo Instituta Morskogo Flota, No 39, 1961, pp 30-40 (from Referativnyy Zhurnal--Avtomatika i Radioelektronika, No 10, 1962, 10-7-125 ya)

Reasons are established for the errors in the measured phase difference of a Decca radio navigation system during the day and during the night; the influence of similar errors on the accuracy of determination of a ship's position is considered within the range of the navigation system, A graphic method is used in order to avoid cumbersome calculations and to afford the possiblilty of plotting on a chart a line of equal accuracy of determination of a ship's position within the confines of a region served by a network of stations. It is shown that navigation in the western part of the Gulf of Finland and the Gulf of Riga (served by the so-called Swedish network) can be accomplished with the required accuracy.

36. Improving Corrections in Radio Navigation Systems

"On the Numerical Values of the Phase Velocity in the Propagation of Surgace Radio Waves and the Improvement of the Method of Introducing Corrections to the Propagation of Radio Waves in Phase-Type Radio-Navigation Systems," by Yu. I. Nikitenko, Trudy Tsentral'nogo Nauchno-Issledovatel'skogo Instituta Morskogo Flota (Proceedings of the Central Scientific-Research Institute of the Maritime Fleet), No 39, 1961, pp 41-54 (from Referativnyy Zhurnal--Avtomatika i Radioelektronika, No 10, 1962, 10 Zh 147)

The discussion involves certain shortcomings of the accepted method of computing the conditions of propagation of radio waves and presents numerical values for the phase velocity of radiowave propagation, as well as relationships which afford the possibility of simplifying and improving accuracy in the intorduction of corrections in radiowave-propagation values for the "Koordinator" phase-type radio navigation systems.

37. Eliminating the Night Effect in DF Systems

"The Elimination of the Influence of the 'Night Effect' in Radio Direction-Finding," by V. I. Bykov, Informatsionnyy Sbornik. Tsentral'nyy Nauchno-issledovatel'skiy Institut Morskogo Flota Information Collection. The Central Scientific-Research Institute of the Maritime Fleet), No 70, 1961, pp 9-14 (from Referativnyy Zhurnal-- Avtomatika i Radioelektronika, No 10, 1962, 10-7-128 a)

The night effect is discussed with respect to its influence on the determination of direction toward the radio station. The elimination of such effects by using a two-channel visual DF with cathode-ray tube display is recommended. The technical data for such an apparatus are given, and instructions are given for its use under night-effect conditions.

Ultrasonics

38. Effect of Clamping of Interferometer Crystal on Sensitivity

"On the Question of the Influence of the Design of the Ultrasonic Interferometer on the Quality of the Reaction Curve," by V. Ilgunas and K. Paulauskas, Moscow, Primeneniye Ul'traakustiki k Issledovaniyu Veshchestva (The Application of Ultrasonics to the Study of Matter -- a collection of articles), No 13, 1961, pp 139-149 (from Referativnyy Zhurnal-- Avtomatika i Radioelektronika, No 10, 1962, 10-5-30 f)

Refinement of ultrasonic-interferometer theory affords the possibility of dispensing with the simplified notion that the back wall of the interferometer crystal by considered free. The electrical impedance is computed for

the case where layers of finite thickness are present on both sides of the crystal. It is shown that the electrical impedance of the crystal can be expressed by the mechanical impedance of the boundary layers in the following form:

$$Z = \frac{a^2}{4e^2 S} \cdot (Z_{vx} - Z_{evx}),$$

where Z_{evx} is the mechanical input impedance of the one electrode, Z_{vx} is the mechanical input impedance of the layer of flowing medium, a is the thickness of the crystal, e is the piezoelectric constant, and S is the surface of the crystal. If attaching the interferometer crystal increases the active losses of the crystal, then the relative change in the impedance value of the interferometer (Z_{ω_0}) during the shifting of the feflector is reduced, which means that the sensitivity of the interferometer is reduced. A rigid clamping of the crystal, which markedly increases the reactive component of the mechanical impedance of the interferometer, causes an asymmetry of the reaction curve.

39. Effect of Ultrasound on Heat Exchange of Bodies in Liquids

"Influence of Ultrasonic Waves on the Heat Transfer of Bodies in Liquids," by E. P. Yaronis, A. A. Shlanchauskas, and A. A. Zhukauskas, Moscow, Preimeneniye Ul'traakustiki k Issledovaniyu Veshchestva (The Application of Ultrasonics to the Study of Matter -- A collection of articles), No 12, 1960, pp 81-85 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 10-5-29 kh)

An experimentalsstudy was made of the influence of ultrasound (acoustic wind and intensity) on the heat exchange of a sylinder and of a sheet in water and in transformer oil. It was shown that the turbulent action of the microflows in the boundary layer is comparable to the belocity of the turbulent flow. The data are converted into similarity criteria in order to facilitate ancompariosn of all the experimental situations. It is shown that the direction of the acoustic wind in water considerably influences the heat exchange. Heat exchange in water depends primarily on acoustic wind. The velocity of acoustic wind in transformer oil is low and, in the opinion of the authors, enhanced heat transfer in oil is caused by microflows at the wall. It was found that the rate of improvement of heat transfer increases with increased intensity of the ultrasonic waves, but that the rate of improvement of heat transfer slows down as the flow velocity increases while the intensity remains constant. No marked influence of the ultrasonic waves on heat transfer was observed in the case of flow velocities under one meter per second.

40. Similarity of Absorption and Velocity of ultrasound in Organic Liquids

"On the Similarity of the Absorption and Velocity Coefficients of Ultrasound and the heat Capacity Ratios Measured Along the Saturation Curve in Organic Liquids and Their Heated Vapors in the Critical Range," by V. F. Nozdrev and A. A. Glinskiy, Moscow, Primeneniye Ul'traakustiki K Issledovaniyu Veshchestva (The Application of Ultrasonics to the Study of Matter -- a collection of articles), No 12, 1960, pp 81-85 (from Referativnyy Zhurnal -- Avtomatiki i Radioelektronika, No 10, 1962, 10-5-28 k)

For a certain property of matter x, measured along a saturation curve, the theory of similarity provides the relationship

$$\frac{x}{x_n} = f\left(\frac{T}{T_{kp}}, A\right).$$

For each group of similar substances there corresponds a certain value of the specific criterion A.

Here, the feasibility of this relationship is tested for experimentally measured coefficients of absorption and velocity of ultrasound in ten organic liquids and their heated (and partially saturated) vapors in the critical region, as well as the feasibility of this relationship for the heat capacity ratio.

41. Interferential Drop in Interferometric Measurements of Ultrasound in Gases

"Study of the Propagation of Ultrasound in Monoatomic Gases," By I. I. Perepechko and V. F. Yakovlev, Moscow, Primeneniye Ul'traakustiki k Issledovaniyu Veshchestva (The Application of Ultrasonics to the Study of Matter -- a collection of articles), No 12, 1960, pp 65-74 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika , No 10 1962, 10-5-27 y)

A study was made of the absorption and rate of propagation of ultrasound at frequencies of 896 and 495.7 kilocycles in the four monoatomic gases helium, neon, argon, and xenon. The measurements were made at 300 deg K with an ultrasonic interferometer. The date were processed in accordance with Krasnushkin theory , on the basis of which it was concluded that the measured absorption factors were not true values, since the calculation must account for drop factor connected with the interferences of various waves produced at the interferometer and particularly sharply expressed for gasses with low absorption properties. When the drop was taken into account, the absorption factor for all four gases was in good agreement with Stokes-Kirchoff theory,. and thus no anomalous absorption was detected in the range 0.5 - 20 Mc/atm.

Wave Propagation

42. Directional Properties of Microwaves Scattered From Meteor Trails

"Investigation of Directional Properties of Microwaves Scattered From Meteor Trails," by V. F. Chepura, E. L Kashcheyev, and B. G. Bondar'; Moscow, Elektrosvyaz', No 11, Nov 62, pp 3-10

One of the experimental methods for investigating the formation of an ionized meteor trail, the speed of charge difusion in ti, and the degree of distortion of the trail due to the wind consists in simultaneous reception of two or more microwave signals scattered forward by different sections of the meteor trail. The investigation can be carried out either by reception of a signal from one transmitter at two widely separated points or by reception of a signal at one point from two separated transmitters operating on two slightly different frequencies. The reciprocity holds because the propagation of microwaves in this case takes place in a region of the atomsphere extending not over 120 km.

In the present investigation, the second method was used. The stationary transmitter operated on a frequency of 47,973 kc, and the transmitter installed on a truck operated on a frequency 20 kc higher than that of the first transmitter. Both of the crystal stabilized transmitters were identical in construction. The pulse duration was 5 microsec, pulse repetition rate was 100 per second, and pulse power was one kw. The reception point was located about 900km from the stationary transmitter. Five-element Yagi type antennas were used at the transmitting and receiving points. The received signals were recorded on a film with an oscillograph. The mobile transmitter was operated at 34 different points along 6 different routes. The distance from transmitter to receiver varied from 11 to 320 km.

Data were secured on changes in the correlation coefficient for two signals having a small frequency difference. The dependence of the correlation coefficient on level and the coincidence time of the signals was established.

42. Effect of Fast Ionospheric Changes on Radio Communication

"Fast Processes in the Ionosphere, " by N. D. Bulatov and Ye. I. Khristova; Moscow, Radiotekhnika, No 12, Dec 62, pp 28-32

Modern semiautomatic and automatic ionosphere condition recorders make it possible to obtain precise data on ionosphere paramaters as a function of time. Such records of ionosphere response to H-F radio waves are obtained at a rate of four per minute. The daily record of ionosphere fluctuation can be viewed with a movie projector in 4 minutes, thus affording a convenient way of studying ionosphere variation.

Special attention was given to study of the $h'F_2$ layer altitude variation because such sudden variations produce distortions in phase-modulated signals. The most pronounced effect of altitude variation of the reflecting layer is felt when the incident radio wave is close to vertical, i.e., as in the case of short-range communication (200 to 300 km).

Future studies should be concerned with evaluating quantitatively the effect of reflecting-layer altitude variation on the phase shift during the period of transition from one layer to another, as well as analyzing the fine phase structure of a signal due to multiple reflections and the degree of splitting caused by the magnetic-ionic effect.

44. Electromagnetic Wave Propagation in Ionospheric Layers

"Asymptotic Representation of the Solutions of the Maxwell Equations in Smooth Ionospheric Layers," by G. I. Makarov; Leningrad, Problemy Difraktsii i Rasprostraneniye Voln (Problems of the Diffraction and Propagation of Waves -- a collection of articles), 1962, pp 63-95 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10 Zh 152)

The method of standard equations is used to solve the problem of the distribution of electromagnetic waves in ionospheric layers. It is assumed that ε_m (permittivity) is a monotonous function of altitude z. The measure for the change of $\varepsilon_m(z)$ is the half-thickness of the layer z_c, whereby

$$\frac{d\varepsilon_m(z)}{dz} \ll \frac{\varepsilon_m}{|z_c|};$$

it is further assumed that $\eta_0 = k|z_c| \gg 1$, where k is the wave number.

With these assumptions, asymptotic soultions are obta ned for the Maxwell equations for the case of unbounded and bounded layers.

A method is given for computing the loss which is due to the collision of electrons with heavy particles.

45. Standard Equations for Layers of Ionosphere

"Arriving at Solutions of Standard Equations of Ionospheric Layers," by G. I. Makarov, Leningrad, Problemy Difraktsii i Rasprostraneniya Voln (Problems of the Diffraction and Propagation of Waves-- a collection of articles), No 1, 1962, pp 5-23 (from Referativnyy Zhurnal-- Avtomatika i Radioelektronika, No 10, 1962, 10 Zh 151)

The problem involved is that of finding the solution for the fields in a wave propagating within the ionosphere. It is assumed that the distribution function of the electron ceoncetration with altude is represented by a smooth curve with one maximum and that the influence of the magnetic field of the earth is neglected.

The main parameter, for which the asymptotic solution is obtained, is the value $_{o} = k \quad z_{c} \quad 1$, where k is the wave number and z_c is the half-thickness of the layer. The obtained solutions of the standard equation are expressed by Hankel and Whittaker functions for the case of a bounded and an unbounded layer.

46. Pulse Propagation Above Conducting Earth

"The Propagation of an Electromagnetic Pulse Above a Spherical Earth," by E. M. Gyunninen and G. I. Makarov, Leningrad, Problemy Difraktsii i Rasprostraneniya Voln (Problems of the Diffraction and Propagation of Waves), No 1, 1962 (from Referativnyy Zhurnal-- Avtomatika i Radioelektronika, No 10, 1962, 10 Zh 146)

The problem involves the excitation of an electromagnetic field above the surface of a sphere with finite conductivity by means of a radical electrical dipole with a harmonic current connected in a zero moment of time. The solution of such a nonstationary problem, which is readily obtained in the form of a Laplace integral (whereby into the expression under the integral sign is entered the solution of an analogous problem for a purely harmonic dependence of current on time), is considered for the case of a finite sphere conductivity and for the limited case of an ideally conducting sphere.

It is shown that the duration of the transient process increases with decreasing conductivity of the earth, with increased duty cycle, and with regression of point of observation from the source.

In the case of a finite conductivity of a reflecting sphere, the shape of the pulse is distorted, whereby the low frequencies are accentuated in the pulse spectrum.

47. VHF Scattering in the F_2 Layer

"The Scattering of Short Radio Waves in the F_2 Layer of the Ionosphere," by V. I. Bocharov, O. M. Nesterova, and I. I. Nesterova; Trudy Sibirskogo Fiziko-tekhnicheskogo Instituta pri Tomskom Universitete (Proceedings of the Siberian Physico-technic Institute at Tomsk University), No 38, 1960, pp 74-79 (from Referativnyy Zhurnal-- Avtomatika i Radioelektronika, No 10, 1962, 10 Zh 179)

The possibility is established of a scattering of waves of the short-wave and lower part of the ultrashort-wave ranges in the F layer of the ionosphere, which indicates the presence of mocro-inhomogeneities in the inhomogenetiy spectrum. Experimental data are given on the scattering of waves with a frequency of 21..2 megacycles over a 1,340-kilometer distance in the F_2 layer. The possibility is indicated of establishing communications on frequencies twice and thrice that of the maximum usable frequency of the F_2 layer. It is shown that an earlier reported (Referativnyy Zhurnal--Fizika, N8 5, 1958, Abstract No 11340), No 5, 1958, Abstract No 11340) approximate formula for computing the influence of refraction on the scattering of radio waves is in good agreement with experimental data.

48. Graphic Plotting of Radio Links

"Graphic-Analysis Method of Computing Radio Links," by Sh. G. Shlionskiy, Trudy Instituta Zemnogo Magnetizma, Ionosfery i Rasprostraneniya Radiovoln, AN SSSR, (Proceedings of the Institute of Terrestral Magnetism, Ionosphere, and Radiowave Propagation , Academy of Sciences USSR) No 19 (29), 1961, pp 131,-139 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-7-63 g)

The basic calculation involves the solution of the equation

$$\left[E^{(1)}_{sig}\right] = T + \left[E^{(1)}_{nom}\right],$$

where $E^{(1)}_{sig}$ is the intensity of the signal field at an effective power of one kilowatt; $E^{(1)}_{nom}$ is the intensity of the noise field at a passband width of one kilocycle; T is the technical factor of the radio apparatus. $E^{(1)}_{sig}$ is represented as a family of frequency curves for various distances

and critical frequency values for the E layer. The $E_{nom}^{(1)}$ frequency curves apply to various noise levels at one megacycle (for various noise figures).

$E_{sig}^{(1)}$ and $E_{nom}^{(1)}$ are expressed in decibels, and the curves are plotted on the same scale. The unknowns are found at the point of intersection of the two curves, and the accuracy of the determined maximum usable frequency and other values depends on the accuracy of the plotted curves.

49. Noise Intensity in Beyond-the-Horizon Communications

"Theoretical and Experimental Investigation of Transient Noise Intensity During Multipath Reception," by I. A. Gusyaminskiy and E. Ya. Ryskin; Moscow, Elektrosvyaz', No 12, Dec 62, pp 3-13

Interchannel transient noises originating as a result of the multipath nature of ultrashort-wave beyond-the-horizon transmission are investigated. One step in the investigation which, in the authors' opinion, has been omitted from previous studies of this subject, resulting in discrepancies between experimental and theoretical results, is the determination of not only the average value of noise intensity, but also a law of probability distribution for different states of the propagation medium. Experimental measurements were measurements were made over a 300-km section using an antenna directivity pattern width of 1°. A noise load with a level corresponding to 60 telephone channels was applied to the input of the transmitter. The frequency departure, corresponding to the measurement level of one channel, was equal to 100 kc. Qualitative results of measurements fully verified the theoretical conclusions, and a quantitative comparison based on probability distribution curves of transient noise level showed good agreement.

50. Secondary Attenuation in Microwave Scattering

"On the Question of the Scattering of Electromagnetic Waves at Local Inhomogeneities of the Troposphere," by Ch. Ts. Tsydypov, Kratkiye Soobshcheniya Buryatskogo Kompleksnogo Nauchno--issledovatel'skogo Instituta (Brief Reports of the Buryat Complex Scientific-Research Institute), No 2, 1960, pp 24-27 (from Referativnyy Zhurnal--Avtomatika i Radioelektronika, No 10, 1962, 10-7-155 i)

A formula is derived for computing secondary microwave attenuation caused by local relief in a determination of microwave scattering at local tropospheric inhomogeneities. The attenuation function L (i.e., the ratio of received power to power in free space) resulting from the presence of an angle of cover for both the transmitter and receiver is expressed by the formula

$$L = 0.016\, k\, \frac{d^4 S_p}{(R_1 + R_2)^2 R_2\, \theta_{min}^3},$$

where k is the coefficient accounting for the reflection from the earth; d is the distance between transmitter and receiver; S_p is the scattering parameter; R_1 and R_2 are the distances from transmitter to scattering space

and from it to the receiver; $R_э$ is the equivalent radius of the earth; and θ_{min} is the minimum angle of scatter. In the absence of obstructions in the form of mountains, the formula is converted into the well-known formula of Gordon for a smooth surface.

Miscellaneous

51. Recent Soviet Patents in the Field of Electronics

"Class 21. Electrical Engineering"; Moscow, Byulleten' Izobreteniy, No 19, Oct 62, pp 24-27

Class $21a^1$, 34_{13}. No 150539; by P. V. Makovetskiy. Transmitting Television Tube.

Class $21a^1$, 34_{31}, No 150540; by O. V. Chekan and Ye. M. Petropavlovskaya. Device for Setting in Quadrature the Chrominance Signals in Color Television System.

Class $21a^4$, 48_{66}, No 150541; by G. I. Rukman and V. B. Braginskiy. Modulator of Electromagnetic Radiation.

Class $21a^4$, 71, No 150542; by L. V. Iogansen. Device for Conversion of Electromagnetic Flux.

Class 21c, 59_{25}, No 150544; by A. A. Kokorev and V. G. Sokhin. Speed Control Relay.

Class 21c, 36_{03}, No 150549; by V. M. Degtev, N. Sh. Pinskiy, and B. V. Vasil'yev. Device for Measuring Resonance Frequency and Attenuation Decrement in Solid Materials.

Class 21g, 13_{06}, No 150550; by Ye. N. Pogatkin. Fabrication Method for Radio Tube Grids.

Class 21g, 13_{17}, No 150551; by V. M. Artemov and B. S. Grishin. Device for Energy Extraction From a Pencil-Type Traveling Wave Tube.

Class 21g, 13_{50}, No 150552; by Yu. I. Nabokov. Method of Measuring Conversion Transconductance in Electron Tubes.

Class 21g, 34, No 150557; by I. S. Gonorovskiy. Device for Simulating Multisection Four-Terminal Network.

II. ENGINEERING

Automatic Control Engineering, Computers

52. Status of Electronic Computers in the Soviet Union

"Electronic Machines Today and Tomorrow"; Kishinev, Sovetskaya Moldaviya, 5 Dec 62, p 4

The following is a paraphrased account of a TASS interview of the State Committee of the Council of Ministers of the USSR on Radio Electronics at the November Plenum of the Central Committee of the Communist Party of the Soviet Union:

Question -- What kind of high-speed computers are now being produced in the Soviet Union?

Answer - "Ural-2," "Ural-4," "Minsk-1," and "Razdan-2" are operating in computing centers, solving engineering problems, and computing comodity prices. Recently a number of new electronic computers based on semiconductors has been turned out, such as "Minsk-2," "Promin'," and others. Such machines, especially one like "Promin'," are used for scientific and engineering computations and processing relatively small amounts of information. All of these machines operate at speeds "up to 10,000 operations per second," but "for the solution of especially complicated problems engineers and scientists have built machines whose productivity is immeasurably greater."

Question -- What results have computers had in the national economy?

Answer -- They have been very effective in scientific and engineering problems, in economics and planning, and in controlling production operations. An example of the latter is the Magnitogorsk Metallurgical Combine. By means of the "Stal'-1" automatic control system in steel rolling the system paid for itself in one month and will save more than 800,000 rubles a year. A "Stal'-2" control system is being put into operation which will result in even greater control of production. Similar systems are in operation at Nizhnetagil'sk Metallurgical and Noveomoskovskiy Chemical Combines. "Electronic railway engineers" run the subways. The Moscow branch of the Gosbank USSR processes 250,000 to 300,000 documents daily, in addition to outgoing information amounting to 400,000 to 450,000 documents. It is estimated that the electronic system of bookkeeping will pay for itself in 2 to 2.5 years and reduce thenumber of general accounting personnel by 600.

Question -- What kind of future do computers have in the national economy?

Answer -- The future is bright. Technical progress is unthinkable without electronic computers. They are indispensable. However, there are problems involved: the adaptation of documents for processing by machines, developing better methods of solving problems on computers, and training personnel to run high-speed computers being some of the more important ones.

53. Present Status of BESM-2 in Soviet Union

"Masters of the Electron," by K. Vysokov; Moscow, Stroitel'naya Gazeta, 5 Dec 62, p 4

The present status of the BESM-2 computer in the building industry is appraised. The important characteristics of this computer are said to be 10,000 operations per second; an internal memory capacity of more than 2000 locations; two magnetic drums, each with a capacity of more than 5000 "codes"; and magnetic tapes of 30,000 each. Input is by punched cards.

A BESM-2 is presently in operation at the branch of mechanization of engineering and technical computations of the State Institute for Prototype Design and Planning for Technical Research of the USSR. It is facilitating research on a project of the Academy of Construction and Architecture called "The Optimal City." Numerous instances of its use in the field of construction and location of highways and railroads are cited.

According to the author, the BESM-2 saves the government about 2,000 rubles every hour it is in operation. As an example, its use is said to have saved the All-Union Central Design and Planning Institute for Mine Construction in the Coal Industry 16 million rubles in the selection of optimal construction of new coal mine shafts and in the construction of mining conveyances.

A photograph showing the layout of the BESM-2 with its control panel accompanies the article.

54. Automation of the Future for Power Plants

"Elektrodis," by N. Stroganov; Ekonomicheskaya Gazeta, 29 Dec 62, p 17

In the Moscow Power Engineering Institute a method for simulating the flow of electricity in a power plant has been worked out. The author visited the problem laboratory of the branch of electric systems at the institute and describes a machine of the future called "Elektrodis," or electronic dispatcher.

This machine controls all "power systems," with tens of millions of kilowatts, without human intervention. According to the chief engineer of the plant, similar machines are being planned for all power stations. In this plant there are no bookkeepers, planners, nor economists. The machine takes the place of all of these people. At any time it is ready to communicate the cost of manufacture of a kilowatt-hour in all systems and at any station, where and how much power is being produced.

Although the number of human operators has been reduced ten times, the chief engineer states that "the machine, for all its perfection, always remains a machine. For many years to come no electronic equipment can, over a prolonged period of time, control a power system without some human intervention."

55. Capabilities of New Czech Computer

"EPOS--Proof of the High Standard of Czech Science and Engineering," by V. Capla, engineer; Bratislava, Tudomany es Technika, Vol IX, No 26, 1962, p 921

Author called on Dr A. Svoboda, docent and chief designer of the Czech EPOS computer, and asked him to give an outline of the capabilities and advantages of EPOS. Dr Svoboda replied as follows:

EPOS consists of electronic parts, i.e., germanium diodes, transistors, and electron tubes, as well as of mechanical parts produced exclusively in Czechoslovakia.

EPOS is a "universal" system which can be used to solve a great variety of Problems. The designers placed special emphasis on making it an economical solution to problems of data processing as well as practical scientific-technical problems. It will be possible to connect it to measurement centers, when the latter are designed in appropriate form, and thereby control the most "diverse" processes.

It makes possible the solution of five programs in such a way that these are entirely independent of one another from the viewpoint of logic as well as of time. It is capbale of accepting a new program at any time without requiring alterations in the "ordering" program.

The computer has an average speed of 17,000 operations per second. Special locic units detect errors caused by mechanical malfunction. The errors detected in this manner are automatically corrected. The computer has an alphabet consisting of 80 symbols.

56. Computers -- Credits and Debits

"The Electron and Life," by V. Kabulov, chief of the Computing Center, Corresponding member of the Uzbek SSR Academy of Sciences; Tashkent, Pravda Vostoka, 20 Dec 62, p 3

The author is the chief of the Computing Center of the Institute of Mathematics imeni V. I. Romanovskiy of the Uzbek SSR Academy of Sciences. His article is a survey of the accomplishments and the future of the center.

One of the problems he cites as having been solved with the aid of computers is planning for the future of Uzbekistan. The population distribution and urban, rural, and cultural construction for the periods 1965-1970, 1970-1975, and 1975-1980 were predicted with an expenditure of just 26 hours of machine time. Numberous other examples of problems that have been solved by computers include control of rail, highway, and air transportation; taking the amount of surface water into consideration for purposes of irrigation; and the most economical exploitation of deposits of natural gas.

In spite of the rosy picture he paints, the author indicates that all is not perfect in the Uzbek computer situation, and he lists several reasons for this:

1. Some people appear to think that there is not enough work for the machines to do.

2. The value of the electronic computer in solving problems is not sufficiently appreciated by some in authority. His computing center, in particular, needs two special-purpose machines, which he hopes to obtain through the help of the presidium of the Academy of Sciences of the republic.

3. There are not enough qualified personnel for the computers. At least 10,000 programmers would be required to fill the needs of all the organizations requesting aid from the computing center. Unfortunately, training in the field of programming does not receive enough support from the Ministry of Education of the republic.

In conclusion, the author suggests that the control of all high-speed electronic computers be placed in one Central Asiatic Computing Center which would coordinate all the economic needs of central Asia.

57. Leningrad Computing Center of Academy of Sciences USSR

"Mathematics -- the Toiler," by M. Vasin; Leningrad, Leningradskaya Pravda, 4 Jan 63, p 4

The subtitle of the article, "Report from the Leningrad Computing Center of the Academy of Sciences of the USSR," pretty well reflects the content. The computer used is a BESM-2, and after the usual descriptions of the machine and comparisons with human mathematicians as regards speed and volume of work turned out, the author describes in general terms the work of the organization, planning for industrial development and construction, making engineering and sceintific calculations. The average age of the members of the computing center is 28-29 years.

The interesting point is made that many heads of industrial and commercial enterprises have yet to be convinced of the great advantage of computers over human mathematicians in developing more efficient methods of operation.

Referring to the nature of the computer itself, the author says that after the writing of the program for a particular problem the work is largely automatic. "Man only formulates the problem. The machine does all the rest."

58. Latest Accomplishments of Atomata

"Accomplishments of 'Thinking' Machines," by Boris Glebov; Vil'nyus, Sovetskaya Litva, 9 Jan 63, p 4

The author lists some of the latest accomplishments in the field of automation. In one institute a machine has been built which distinguishes between objects, for example, between a drawing of a man and that of a cat. Another machine distinguishes numbers. In Moscow and other large cities machines control the transportation of materials from factory to consumer (for example, from a cement plant to a construction project) in the most efficient manner, as regards routes, loading, etc.

A bearing plant has been built in Moscow in which a computing center will control production, replace defective units with new ones, and deliver the finished product at the factory door "without human intervention."

59. "Thinking" Automaton

Small 'Lunnik'"; Frunze, Sovetskaya Kirgiziya, 11 Jan 63, p 3

A small self-propelled apparatus called "Lunnik" has been built which reacts to light, sound, and obstructions. Its electronic "brain" is based on semiconductor elements. It will soon be demonstrated in the department of Basic Automation and Telemechanics of the Polytechnical Museum.

"Lunnik" is alleged to have the ability to "learn." When a lighted match is first presented to its revolving screen, it slowly stops, as though "thinking," but after repeated operations with light, it will finally "remember" this type of signal and obediently stop the first time a flame is subsequently presented to it.

60. Machine for Translating Ordinary Text Into Braille

"The Machine Learns To Read," by Vlastislav Toman, chief editor of the magazine "ABC" (Prague); Moscow, Yunyy Tekhnik, No 12, Dec 62, pp 19-20

A machine for transforming printed material into braille has been devised by a Czech engineer with the Prague Research Institute of Communications. It will "read" not only printed and typewritten text, but also handwritten text; however, letters and digits of the latter type must be clearly drawn between successive 6-dot patterns on a cardboard.

The "reading" is accomplished in the following manner:
Each letter or digit is projected by a lens onto seven reference lines of the sequential image-scanning equipment. The combination of intersecting and nonintersecting lines of the reflected image of the character with the seven reference lines is sufficient to identify the character.

Reliability of the equipment is such that errors do not occur more frequently than once in 0,000 times. The Czech machine is entirely transistorized and is small enough to put on a writing table.

61. Electronic Teacher

"Electronic Teacher"; Frunze, Sovetskaya Kirgiziya, 11 Jan 63, p 3

One of the uses of which the URAL-1 computer is presently being put is the teaching of the German language in schools in Kiev and Leningrad. The program for the machine is in the form of questions and answers, and the computer will "ask" a question indefinitely until it receives the correct answer. According to the director of the university computing center, the group method now in use can be adapted to individual instruction.

62. Automation in Estonia

"Cybernetics in the National Economy"; Tallin, Molodezh'Estonii, 23 Dec 62, p 2

The article concerns the growing computing center of Tartu State University, with a staff of 22 people. A URAL computer is the "brains" behind the organization.

An important use of the computer is with industry in Tartu, in particular, with instrument building and the "Vyyt" agricultural machinery plant, aiding more efficient production. Its calculations are also resulting in greater efficiency in agriculture, in selecting which crops to concentrate on and the amounts to plant. A larger computer, the URAL-4 is expected to be installed in 1963.

63. Voice Control

"The Machine Is a Translator"; Tbilisi, Zarya Vostoka, 31 Dec 62, p 3

Although admitted to be an over simplification, the basic solution of machine translation of foreign languages is seen to be the numerical coding of concepts. As an example, the Russian word "stol," meaning "table," is given a number which would be assigned to the word for "table" in all languages.

Using the example of the truck controlled by voice commands, the author foresees the voice control of industrial production operations, oral feeding of information into computers, and fuller use of telephone communications. He predicts that machines will be built in the future which will be able to locate industrial breakdowns simply by the noise of the particular operation involved.

64. Multiple Utilization of Components in Analog Computers

"Multiple Utilization of Functional Units in Electronic Analog Computers," by S. R. El'kin; Moscow, Priborostroyeniye, No 12, Dec 62, pp 12-13

Investigations of certain computer circuits have shown that in many cases a considerable reduction in the number of functional units incorporated in a computer can be obtained by employing multiple utilization of such units during the process of problem solution. It was also shown that such multiple utilization of computer units does not lead to greater complexity of the circuit nor does it affect precision of computation.

The multiple utilization of computer functional units is most desirable when the formulas employed contain several identical terms or the operating scheme involves multiple sampling and processing of the data of several pick-up units.

The Tbilisi Scientific-Research Institute for Instrument Building and Means of Automation (TNIISA) developed a computer employing multiple utilization of various functional units. Also a new specialized analog computer with multiple utilization of its functional units is now being developed.

A common drawback in the suggested circuits is the presence of step-by-step relays. The efforts of future research will be directed toward wider use of contactless elements in analog computer circuits.

65. New Soviet Computers

"New Computer Equipment" by V. I. Loskutov; Moscow, Priborostroyeniye, No 11, Nov 62, pp 29-31

Soviet engineers have designed a new small universal digital computer, the "Razdan," intended for solution of scientific and engineering problems of a wide variety. The computer comprises the following units: arithmetic unit, control unit, operating memory unit, external storage on magnetic tape, input unit, semiconductor

voltage regulator, printer, and perforator. All circuits were built with semiconductor components, thus limiting the over-all dimension of the computer to 1.9 X 1.7 X 1.06 m. and insuring great reliability and stability of performance. The arithmetical operations are performed with binary numbers and floating point. The numbers are made up of 29 binary places for mantissa, two binary places to indicate the sign, five binary places to designate the number sequence, and two binary places to indicate the sign of the number. The instruction code consists of 36 binary places. The average speed of the machine is 4,500 arithmetical operations a second. The operating memory is built with ferrite cores and has a capacity of 2,048 numbers or instructions with access time of 25 microsec. The storage capacity of the tape memory is 120,000 numbers or instructions with entry and reading speed of 2,000 words a minute.

Exchange of information between the external storage and operating memory is carried out either in individual numbers or in groups of numbers. The range of numbers with which the machine is able to operate is from $\pm 10^{9}$ to $\pm 10^{18}$. The printer operates at a speed of 20 numbers per sec.

For normal operation of the "Razdan" computer the ambient temperature should not exceed 25°C and the relative humidity 70%. The power consumption of the machine is about 3 kw. The "Razdan" is now manufactured serially.

Another new computer is the "Setun'", which is the first machine ever to operate on the ternary system.

66. Use of Soviet Computer in Czechoslovakia

"Several Billion Computing Operations During 6 Months," CTK dispatch; Bratislava, Uj Szo, 7 Jan 63

This Czechoslovak news service dispatch reports that the Ural 2 Soviet electronic computer put into operation on 1 July 1962 in the Transportation and Postal Affairs Computations Laboratory in Prague-Zizkov has now been in operation for 1,200 hours net time and has carried out several billion computing operations. The capacity of the machine is such that it works 24,000 times faster than an experienced operator with a calculator. The laboratory is now turning to automation of freight transportation, and the machine is being used to develop timetables to be used as a basis for the 1965-1980 plans for Czechslovak railroads. The machine is also used to solve other problems.

67. Czechoslovak Mechanical Linguistics Laboratory

"Linguistics"; Prague, Jemna Mechanika a Optika, No 12, Dec 62; inside back cover

The Institute of the Czech Language of the Czechoslovak Academy of Sciences is using computers for philological and lexicographic research. The mechanical linguistics laboratory, which is being planned, will permit more extensive mechanization and automation of such difficult and slow tasks as classification and abstracting of material. The facility will include punch cards which will permit work with codes for the Czech and Slovak alphabets, as well as with those for alphabets with varying systems. (FOR OFFICIAL USE ONLY) (COPYRIGHT by the State Publishing House for Technical Literature, Prague)

68. High-Speed Ferrographic Printer Described

"High-Speed Ferrographic Recorder of Digital Information," by I. Ye. Goron, M. G. Arutyunov, V. D. Markovich, V. G. Patrunov, and V. P. Traubenberg; Moscow, Elektrosvyaz', No 12, Dec 62, pp 26-32

The design principles and basic characteristics of ferrographic systems of printing out digital information are examined. The FAZA-1 automatic ferrographic printer described in this article was developed on the basis of investigations conducted at the magnetic recording laboratory of the Moscow Electrical Engineering Institute of Communications. This is the first continuous-action apparatus of its type to have a completely dry (inkless) technological cycle. The FAZA-1 operates on a telegraph code received through a communication channel and is designed to print out digital data on paper tape with a speed of 100 digits per second. The electronic part of the device consists of a decoder, a matrix-former based on ferrite rings with rectangular hysteresis loops, a readout register, output amplifiers, and a magnetic head unit for creating a magnetic relief of the recording symbols on the magnetic drum. The logic and amplifying elements use transistors and ferrites. The image transfer and fixing system used in the FAZA-1 provides stable printing conditions for 50,000-100,000 revolutions of the drum, after which the magnetic coating of the drum (CO-Ni-P) must be restored.

69. New Electronic Compensating Regulator

"New Electronic Compensating Regulator With Flexible Feedback," by G. S. Lyubashevskiy; Moscow, Priborostroyeniye, No 12, Dec 62, pp 14-17

Electronic compensating regulators are used in multistage control circuits on various technological processes. Such a regulator has six identical outputs, and can actuate up to 12 secondary regulators.

The presently serially manufactured MZTA electronic compensating regulator has a number of drawbacks and could not, thus, satisfy the static and dynamic performance requirements. The imperfection of this electronic compensating regulator was mainly due to poor construction of its electronic unit EKP-1 with two feedbacks. The electronic unit EKP-1 does not have provision for dc output, which restricts its use in modern control circuits.

An improved electronic unit, EKP-2, was designed in which the positive feedback is eliminated. The new EKP-2 unit consists of the following components: input transformer, first-stage amplifier, limiter, feedback amplifier, and flexible feedback. The new EKP-2 unit has eliminated most of the shortcomings of the EKP-1 unit.

70. Programmed Control of Hoisting and Transporting Machines

"Programmed Control of Hoisting-Transporting Machines," by A. G. Mekler, Z. Ye. Shafirov, R. B. Askinazi, and M. I. Voronin, Trudy Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Pod'emno-Transportnogo Mashinostroyeniya (Proceedings of the All-Union Scientific-Research Institute of Hoisting and Transport Machine Building), No 5 (16), 1961, pp 3-54 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-2-193 k)

The problems considered involve programming the operations of cranes and other lifting-and-hauling machines and continuous transporting machines and conveyers used in the mass production of industrial products. Block and skeleton diagrams are given for thecontrol section, and the selsyn and synchro sections. A frequency-response method is used for remote control (1,000-2,500 cps spread, with filter pass bands of 115-120 cps). The discussion also treats those problems involved in using a time-separation of channels using semiconductor devices with square hysterises loop. One such circuit is based on ferrite-diode switching, with transistor triggers as outputs.

71. Plung-Board Control for Machine Tools

"Plug-and-Jack Assembly for Programmed Control of Machine Tools," by I. N. Alekhina, Trudy Gor'kovskogo Politekhnicheskogo Instituta, (Works of Gor'kiy Polytechnic Institute), Vol 17, No 2, 1961, pp 128-131 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-2-185 kh)

A description is given of a system developed at the Scientific Research Laboratory of Machine-Tool Design and Cutting Tools, Gor'kiy Sovnarkhoz, for use with various types of machine tools. The system controls feed and fast shifting in both directions along any of three coordinates. Bloc diagrams are given for the oberall installation and for theplug-and-jack panel.

72. Programmed Control of Heavy-Duty Milling Machines

"Installation for Programmed Control of a Milling Machine With Continuous Linear Interpolation," by M. G. Breydo, Trudy Nauchno-issledovatel'skogo Instituta Poligraficheskogo Mashinostroyeniya (Proceedings of the Scientific-Research Institute of Copying-Machine Building), No 15, 1961, pp 3-26 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-2-180 ts)

Circuitry is described which affords the possibility of a synchronous transfer from one moving shaft to several moving shafts with an expanded range of control of the transfer ratios, a condition of great importance in the case of heavy-duty milling machines. The circuitry comprises a gate with a single output and two inputs fed with pulses from a pulse generator and with potential from a trigger, which, in turn, is controlled by signals from a pulsed feedback pickup (photoelectric type) and pulses from the register of a electronic feedback repetition-rate scaler. The transfer ratio between the moving and moved shafts is determined by the combinations of switching contacts of the scaler, and can be arbitrary. The scaler has a number of outputs corresponding to the number of moving shafts it controls. The frequency of the assigned generator should be considerably higher than the frequency of the signals from the feedback transducer.

73. Random Search in Self-Adjusting Systems

"On the Problem of Designing Ultrastable and Multistable Systems," by V. K. Chichinadze, Trudy Instituta Elektronika Avtomatiki i Telemekhaniki, AN GruzSSR (Proceedings of the Institute of Electronics, Automation and Telemechanics, Academy of Sciences Georgian SSR), Vol 2, 1961, pp 17-32 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika No 10, 1962, 10-2-113 k)

The general problems are considered for designing self-adjusting systems based on the principle of random search. Examples of such systems are given in which the stable or optimal process is realized by an automatic variation of parameters, the principle by which both ultrastable and multistable systems operate. Since the main drawback of all search-type control systems is the length of time required for the search, it is recommended here that the system be designed with discrete regimes.

The concepts "ultraoptimum" and "multioptimum" are discussed as they apply to control systems. The time involved in searching out the optimum parameters depends on the required quality, the degree of stability, the variability, adjustment time, total appraisal, etc.

The electronic analog EMU-8 was used to provide a description of an electronic model of a self-adjusting system using the principle of random search.

74. Sequential (Probability) Theory in Machine-Tool Operations Control

"Organizing the Problems of Analyzing the Structural Systems of Production Lines With the Aid of Probability Theory," by R. A. Geogralin and V. S. Gusarev, Nauchnyye Zapiski. Odesskiy Politekhnicheskiy Institut (Scientific Reports. The Odessa Polit-chnic Institute), No 35, 1961, pp 32-42 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-2-101 y)

The possibility is considered of applying sequential theory to the construction of a mathematical model of a production line as a complex system of operations, the mathematical treatment of sequential theory being the use of probability theory.

The assemblies and structural systems are devised for existing and planned automated lines for machining gears and cylinder heads for the DT-24 tractor with standardized machine tools made by the "Churchhill" firm, the total installation embracing 17 systems of operation.

75. Frequency-Response-Interval Method of Designing Servos for Machine Tools

"Computing Corrective Relationships of Servo Systems By the Method of Frequency-Response Intervals," by A. S. Pogodin, Izvestiya Leningradskogo Elektrotekhnicheskogo Instituta (News of Leningrad Electrical Engineering Institute), No 46, 1961, pp 134-148 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-2-95 b)

The fundamentals are given for a method of selecting and computing certain corrective relationships of complex linearized servo systems. The use of the frequency-response-interval method in the synthesis of the servo system necessitates starting with conditions where each corrective relationship acts upon its own particular (given frequency interval, on the basis of which the expressions are found for the transfer function of the corrective relationship and its amplification factor and time constant.

The method described here was used in designing the servosystems for the driving mechanisms of the heavy machine tools of the Sverdlov Works.

76. Binary Decoder Based on Magnetic Amplifier Circuit

"Designing With Contactless Magnetic Relay Circuits Which Are on a Par With Known Relay-Contacts. Half-Wave Circuits Based on Magnetic Amplifiers," by M. V. Pashkovskiy, Izvestiya Kiyevskogo Politekhnicheskogo Instituta, Sbornik Trudov Aspirantov, Elektrotekhnicheskiy Fakultet (News of Kiev Polytechnic Institute. Collection of the Works of the Aspirants; the Electrical Engineering Faculty), No 1, 1961, pp 152-176 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 10, 1962, 10-2-14 b)

Methods are discussed for designing the principal circuit diagrams based on a magnetic amplifier with a relay characteristic based on the algebra of relay-contact circuits. The control winding of the amplifier is used as a contact in the circuit, and the AC winding is used as output. Inversion is provided by suing a control winding which produces a countercurrent with respect to the main control winding.

An example is given of the design of a circuit for a binary decoder based on a magnetic amplifier, and a method is described for computing choke-type magnetic amplifiers which operate as contactless relays.

77. Electronic Devices for Checking Equipment Operation and Industrial Production

"The Use of Instruments To Calculate the Use and Operating Time of Equipment," by I. I. Pogromskiy, Novosibirsk, Rezervy Rabochego Vremeni v Promyshlennosti Sibiri (Reserves of Operating Time in Siberian Industry -- a collection of articles), 1961, pp 57-62 (from Referativnyy Zhurnal -- Avtomatika i Radioektronika, No 10, 1962, 10-2-63 b)

In connection with the necessity of providing an objective account of actual operating times of equipment, the Institute of Economics and the Organization of Industrial Production (IEOPP) and the Institute of Automation and Electrometry, Siberian Department, Academy of Sciences USSR, attempted to produce instruments which would automatically account for the operation of equipment. The following prototypes were designed and built of metal: The SVM-1 device was designed to account automatically for the actual operating time of equipment both during a work shift and for longer periods; the electronic P-3 device was designed for an automatic recording of machine times and shutdowns in metal-cutting tools used in series and mass production work on small and mediumsized items. The P-2 device solves the cmplex problems of automatic calculating and checking the use of equipment. The P-5 differs from the P-2 device in that it provides a differential accounting for the operating times of equipment separated into operation under load and no-load operation. The electronic P-4 device is supposed to solve the problems of automatic accounting of the quantity of production.

78. Derivation of Approximate Equations Describing Complex Industrial Processes

"Statistical Approximation of Variable Equations Describing Relationships in Complex Processes," by E. S. Bozhanov, L. M. Zaydenberg, and G. K. Krug; Novocherkassk, Izvestiya Vysshikh Uchebnykh Zavedeniy, Elektrotekhnika, No 12, Dec 62, pp 1319-1326

Automation of complex processes requires the availability of a set of primary pick-up units capable of furnishing complete information on the whole process, the establishment of quantitative relationships between the controlled parameters of the process, and a knowledge of the algorithm which can use this information for automatic control of the process in accordance with preassigned criteria.

The article is primarily concerned with the problem of finding quantitative relationships between the controlled parameters of the process. A class of complex technological objects is examined here which is characterized by the continuity of variable equations expressing a relationship between parameters, the presence of noncontrolable disturbances which permit mathematical representation of the process only on a probability basis, and the complexity of relationships which are generally nonlinear. The selection of a formula which approximately describes the process is made from a class or group of classes of equations having the form of a power function with several variables. The coefficients of the approximation equation are determined on the basis of least rms error.

A statistical approximation of the variable equations showing the relationship between controlled parameters can be readily obtained with the aid of universal or special computers.

79. New Computer for Control of Industrial Processes

"Computer Controls Industrial Production; Moscow, Pravda, 6 Jan 63

A short note reads as follows:

"A new multipurpose control machine, "UMShN,' assembled with semiconductor components, has just undergone a successful test. It was designed by a group of scientists and engineers at the Computer Center of the Academy of Sciences Ukrainian SSR under the direction of Academician V. Glushkov and Candidate of Technical Sciences B. Malinovskiy.

"This machine can be used to control various complex industrial processes, such as smelting in Bessemer shops or chemical processes at large cement plants. Such a machine can also be used for automation of open-hearth shops, dispatcher service for railroads, and inspection of intricate parts.

"The machine consists of two parts: a computer and a special attachment containing various pick-up units which feed back all the necessary information on the condition of the industrial process."

80. Information Theory

"Concerning Quantities of Information," by Hu Kuo-Ting; Moscow, Teoriya Veroyatnostey i yeye Primeneniye, Vol 7, No 4, 1962, pp 447-455

In this paper, a strict mathematical relation is established between random variables X_i ($i = 1, 2, \ldots$), taking on a finite number of values, and an additive function $\varphi(A_{ij})$ ($j = 1, 2, 3$). This relation enables the author to determine all algebraic relations between entropies and various quantities of information.

81. Steady State and Dynamic Mode of Differential Extremal Systems

"Investigation of Steady State and Dynamic Mode of Differential Extremal Systems," by V. I. Vasil'yev; Kiev, Avtomatika, No 5, 1962, pp 27-34

The article concerns two differential extremal systems operating without scanning oscillations. The effects of the amplification factor and coefficient of steepness of the controlled object's extremal characteristic on the error in the system in the steady state are studied.

Analytic expressions are obtained for the absolute and relative errors. The behavior of systems acted upon by linearly varying disturbances and also by violent disturbances is investigated. In conclusion, the author makes some recommendations on the use of the systems under consideration.

82. Soltuions of Problems of Optimal Control by Method of Successive Approximations

"A Method of Successive Approximations for the Solution of Problems of Optimal Control," by I. A. Krylov and F. L. Chernous'ko; Moscow, Zhurnal Vychislitel'noy Matematiki i Matematicheskoy Fiziki, Vol 2, No 6, Nov/Dec 62, pp 1132-1139

The authors present a method of successive approximations for the determination of optimal control based on Pontryagin's maximum principle. Examples are given illustrating the method for both fixed and variable time. Conditions for convergence are also discussed.

The application of the method to a physical situation is illustrated by the planar movement of a heavy body in a resisting medium. The control is manifested by two control functions, one of which is continuous and the other -- a type of relay. The equations of motion have the form

$\frac{dx}{dt} = v \cos \theta$, $\frac{dy}{dt} = v \sin \theta$, $m\frac{dv}{dt} = -R - mg \sin \theta$, $mv\frac{d\theta}{dt} = Y - mg \cos \theta$, where t is time; x, y, v, and θ are range, height, absolute velocity, and the angle the direction of motion makes with the X-axis respectively; m is the body's mass; g is acceleration due to gravity; and R and Y are forces of drag and lift, respectively. The foregoing is shown by a figure accompanying the problem.

83. Automatic Photoelectron Discriminator of Printed Information

"Automatic Photoelectron Discriminator of Printed Information," by P. M. Chegolin and V. S. Bogdanov, Ryazan' Radio Engineering Institute; Leningrad, Izvestiya Vysshikh Uchebnykh Zavendeniy; Priborostroyeniye, Vol 5, No 6, 1962, pp 58-66

The article concerns the design of equipment for the introduction of printed information into an electronic digital computer. The basic element of such a piece of equipment is a mosaic consisting of photodiodes. A particular printed character blacks out a given number of elements of the mosaic. Preliminary calculations and experiments indicate that letters of the Russian alphabet can be distinguished by the number of illuminated elements, and it is this phenomenn on which the operation of the equipment described is based.

Recommended by the Chair of Control Equipment and Computer Engineering.

84. Complementary Binary-Decimal Codes

"Binary-Decimal Codes With One Negative Weight," by D. A. Pospelov, Moscow Order of Lenin Power Engineering Institute; Leningrad, Izvestiya Vysshikh Uchebnykh Zavedeniy: Priborostryoyeniye, Vol 5, No 6, 1962, pp 71-76

The paper is devoted to the question of the number of possible binary-decimal codes with one negative weight which have the property of being complimentary. It is shown that there are exactly 17 such codes. They are listed at the end of the paper.

Recommended by the Chair of Computer Engineering.

85. Conference on Use of Cybernetics in Measurement Technique

"Cybernetic Methods of Improving Measuring Apparatus," by S. M. Mandel'shtam; Moscow, Priborostroyeniye, No 10, Oct 62, pp 30-31

"The Second Scientific-Technical Conference on Cybernetic Methods of Improving Measuring Apparatus was held in Leningrad from 26 through 29 June 1962. More than 226 delegates from 12 cities of the Soviet Union took part in the work of the conference.

"The delegates heard 33 reports devoted to certain theoretical aspects and the results of concrete developments of individual components of measuring information systems.

"The report by Yu. P. Drobyshev (Institute of Automatics and Electrometry of the Siberian Branch of the Academy of Sciences USSR) was devoted to the question of quantization for multiplicative noise caused by modulation noises and by instability of the transmission factor of the system, as well as to the problem of designing an optimum quantization scale for the combined effect of additive and multiplicative noises.

"V. V. Sidel'nikov, M. I. Lanin, and S. M. Mandel'shtam reported on works conducted by them at the Institute of Electromechanics (Leningrad) in the field of the mathematical basis for selection of the number of areas of quantization in analog-digital conversion (the case of additive errors).

"The report of B. M. Pushnyy (Institute of Automatics and Electrometry of the Siberian Branch of the Academy of Sciences USSR) considered some of the characteristics of a hypothetical idealized model of an electrical measuring instrument using storage in the presence of heat fluctuations.

"I. A. Shlyakhter (Leningrad Affiliate of the All-Union Scientific-Research Institute of Medical Instruments and Equipment) discussed the tasks of bionics in medical apparatus. S. S. Kurochkin (Moscow) noted some of the features of measuring information systems in nuclear physics. V. V. Sidel'nikov and M. I. Lanin devoted their report to the general possibilities of applying methods of queuing theory to the analysis of the structures of information transmission systems and to a brief review of works performed in this field at the Institute of Electromechanics.

"A number of reports were related to various methods of decreasing errors. S. M. Person, for example, reported on methods developed at the Main Geophysical Observatory for increasing the accuracy of coding equipment by means of the automatic compensation of systematic coding

errors. A. Ye. Bartmer (Institute of Electromechanics) spoke of one method of expanding the frequency range of digital phase meters while avoiding systematic errors. G. P. Vikhrov (Vil'nyus) discussed the possibility of increasing the measuring range in digital instruments for the case where the measured time interval is less than the quantizing pulse repetition rate.

"A group of reports was concerned with frequency pickups, considered the best-suited for systems of automatic centralized control. V. N. Sokol'skiy (Leningrad Affiliate of the All-Union Scientific-Research Institute of Medical Instruments and Equipment) examined the problem of designing a capacity pickup for measuring the specific inductive capacitance of biological liquids at a frequency of 100 Mc. E. I. Rodion (Leningrad Polytechnic Institute) made a detailed analysis of the operation of variable inductors in networks with frequency modulation. A new precision temperature-to-frequency converter, built at at Institute of Electromechanics, was reported by L. A. Nuzhdina, V. S. Popov, and L. V. Skomarovskiy. Great interest was evoked by the report of V. G. Knorring (Leningrad Polytechnic Institute) on methods of descreasing methodological errors of integrating frequency instruments, as well as the reports of V. Ye. Chernyshev and A. Ye. Bartmer (Institute of Electromechanics) and M. Ya. Ginzburg ("Neftekhimavtomat" Scientific Research and Planning Institute, Sumgait) on the linearization of scales of primary analog instruments by means of functional coding.

"Of those reports and papers on concrete developments of analog-digital and digital-analog converters (the subject of almost half of all the presentations), one should first mention the very interesting work by A. I. Petrenko (Kiev Polytechnic Institute) on a functional cathode-ray converter, as well as the semiconductor converter for centralized control machines developed by G. I. Gil'man, L. D. Bulychev, and S. A. Chikhachev (Leningrad). V. N. Khlistunov discussed the high-speed (up to 500 measurements per second) digital voltmeter developed at the All-Union Scientific-Research Institute of Electrical Instrument Construction. N. A. Smirnov, V. B. Smolov, V. S. Fomichev, and Ye. A. Chernyavskiy (Leningrad Electrical Engineering Institute) discussed their ten-digit a-c and d-c digital voltmeter with a control circuit based on dynamic triggers. V. V. Trifonov, a representative of the computer center of that institute, reported on a new, high-speed semiconductor pulse voltage-to-code converter. The participants showed great interest in the reports by V. Ya. Gromyko, L. A. Pletnev, Z. L. Simkin, and G. I. Tyukel' (Moscow) on a digital recording converter with a 50 mv limit and I. A. Zograf on methods of designing digital electrical measuring instruments based on nuclear magnetic resonance.

"One of the reports on "shaft-to-code" converters which should be noted is that by I. V. Mes'kin on miniature photoelectric converters. Yu. V. Bloshteyn and O. N. Nolandt reported on the results of work on transducers with space coding for telemetering systems which were developed at the All-Union Scientific-Research Institute of Electrical Instrument Construction. The operation of "shaft-to-digit" converters in circuits with precisions time delay was analyzed in a report by P. B. Krichevskiy (Leningrad). O. N. Nolandt devoted his paper to the problem of designing decoders for operating in systems of automatic centralized control with pickups having different measurement limits. L. I. Bolgin (Tallin) analyzed the selection of a number of docing system in digital voltmeters from the viewpoint of number of components, noise-immunity, and service life. V. I. Rostovskiy (Vil'nyus) examined the question of designing functionally stable equipment for digital data outputs, which is of particular interest for measuring information systems. E. V. Dityatev (Leningrad Electrical Engineering Institute of Communications imeni Bonch-Bruyevich) reported on a new graphic display unit for a digital differential analyzer.

The conference adopted detailed resolutions directed toward the further development of cybernetic methods in measurement techniques.

Electrical Engineering

86. New High-Voltage Power Lines

"New High-Voltage Line"; Moscow, Pravda, 10 Jan 63, p 1

The new high-voltage power line between the superpower Tom'-Usinskaya State Regional Electric Station and the metallurgical giant "Zapsib" was connected to the West-Siberian Power System on 9 January 1963.

Preparatory work is now being carried out for the construction of another high-voltage power line from the Tom'-Usinskaya State Regional Electric Station to the Teyskiy mine in Krasnoyarskiy Kray. This power line traverse heavily wooded territory and will cross the river Tom! 50 times.

87. Golovnaya Hydroelectric Power Plant Put In Operation

"The First-Born of the Vakhsh Cascade"; Moscow, Pravda, 20 Jan 63

The Golovnaya Hydroelectric Power Plant, the first link in the future Vakhsh river power plant cascade, began operation of its first two 35,000-kw hydroelectric generators. The installed capacity of this plant will be brought up to 210,000 kw. The first 220,000-v transmission line in Tadzhikistan has been completed between Dushanbe and the Golovnaya Plant. Under very difficult high-altitude conditions, the builders of this plant have poured 330,000 cubic meters of concrete, excavated more than 7 million cubic meters of dirt and rock, and erected 5,000 tons of structural steel and equipment.

The construction of the Golovnaya Plant served as a training ground for a corps of future builders of a still larger hydroelectric plant on the same river Vakhsh -- the Nurekskaya Hydroelectric Power Plant.

88. Construction of the Ust'-Ilimskaya Hydroelectric Power Plant Started

"Third Attack on the Angara" Moscow, Pravda, 20 Jan 63, p 3

The first group of surveyors and builders has arrived at Tolstyy Mys (cape) on Angara River, where the huge Ust'-Ilimskaya hydroelectric power plant will be constructed. The construction of a road and a high-voltage power line was started between Bratsk and Ust'-Ilim.

89. Diversion of the Kal'dzhir River

"Ust'-Kamenogorsk" Moscow, Pravda, 25 Jan 63, p 4

The 100-kilometer mountain river Kal'dzhir, a right tributary of the Irtysh in Eastern Kazakhstan, will vanish from the maps in the near future. This will happen because all the water of this river will be utilized in production of electric power and irrigation of adjoining arid land.

The water of the Kal'dzhir river will be diverted through a tunnel to the hydroelectric power plant. The water head at the power house will be 873 meters.

90. Plant for High-Frequency Equipment

"Plant for High-Frequency Equipment" Leningrad, Leningradskaya Pravda, 1 Dec 62, p 2

A short photograph caption reads as follows:

"This high-frequency equipment plant is a relatively small enterprise, not to be compared with such giants as the Kirov or the Leningrad Metal Plant. Yet the enterprises and laboratories of our nation using high-frequency currents for various purposes could hardly get by without the equipment of this plant.

The plant personnel is trying hard to produce and to deliver high-quality products to their numerous clients on schedule."

91. Production of New Arc Extinguisher Organized

"Guardian of Electric Rivers," by K. Zakalyuk; Moscow, Izvestiya, 28 Dec 62, p 6

The production of a newly designed arc extinguisher, "VMP-35," intended for use on 35,000-v power lines, has been recently organized at the Rovenskiy (Rovno) Plant for High-Voltage Equipment. The "newborn" arc extinguiser weighs slightly over 300 kg, which is only one half the weight of its predecessor.

Although the Rovenskiy Plant is only 7 years old, it is well known for equipment built for use in tropical countries. Shipments were made recently to Cuba and Africa.

92. New Type of High-Voltage Insulators

"Basalt Castings" Vil'nyus, Sovetskaya Litva, 25 Dec 62, p 1

An experimental shop for the production of cast basalt parts is located on the grounds of the L'vov city electric power plant. The basalt rock is melted here in electric furnaces at a temperature of 1,200°C. Production of high-voltage basalt insulators is now being planned here.

93. Induction Motor Speed-Control by Variable-Frequency Power

"Effect of Magnetic Circuit Saturation on Induction Motor Characteristics Controlled by Variable-Frequency Power," by K. P. Kotrikov; Novocherkassk, Izvestiya Vysshikh Uchebnykh Zavedeniy, Elektromekhanika, No 12, Dec 62, pp 1372-1378

A better variable frequency induction motor speed-control can be obtained by simultaneous variation of applied voltage at the motor terminals. Such a change in voltage for better speed control should follow the rule as expressed by the equation

$$\frac{E}{E_n} = \frac{f}{f_n}\frac{M}{M_n}$$

Where E and E_n are the instantaneous and nominal values for emf, f and f_n are the values for instantaneous and nominal frequency of power supply, and M and M_n are instantaneous and nominal values of torque. This law for optimum control of voltage and frequency was orginally derived by Academician M. P. Kostenko. However, this law in its original form does not take into consideration the voltage drop across active resistance of the motor stator.

The aim of this article is to further elaborate the laws governing the performance of a variable-frequency induction motor by taking full consideration of saturation change in the magnetic circuit. An exact equivalent diagram of induction motor was used in this investigation. determining working characteristics of a frequency-controlled induction motor if the saturation of the magnetic circuit is not taken properly into consideration.

To ensure least losses due to the change of saturation of the magnetic circuit, the value of the magnetic flux should be increased when the torque drops below the rated value and decreased when the torque becomes greater than the rated value.

94. New Powerful Diesel Locomotive Undergoing Test Run

"Giant of the Steel Track" Moscow, Pravda, 24 Jan 63, p 4

The first 4,000-hp diesel locomotive, "TGP-50," has just been built at the Kolomenskiy Diesel Locomotive Plant and is now ready for a test run. This locomotive is designed for passenger and freight traffic at speeds up to 140 km/hr. The outstanding feature of the "TGP-50" is that it is equipped with a hydraulic transmission. The new locomotive has neither a conventional generator nor traction motors; all of the power generated by diesel engine is transmitted directly to the traction wheels through a hydraulic transmission and a system of drive shafts.

The designers of this new engine are V. K. Shlykov and P. M. Chumikov.

95. Solar Refrigeration

"Sun As a Refrigerator"; Moscow, Komsomol'skaya Pravda, 22 Dec 62, p 4

The laboratory of the Physicotechnical Institute of Turkmen Academy of Sciences is air-conditioned by a solar installation. The simple arrangement consists of a mirror-reflector which concentrates the sun rays on the surface of a pipe filled with liquid freon. The freon vapors are then circulated through a heat exchanger and cooling radiators installed in the building. When the temperature reaches 30°C in most houses of Ashkhabad, the air-conditioned laboratory maintains a very comfortable temperature.

96. New Electrical Engineering Institute

"Short Announcements" Moscow, Promyshlennaya Energetikay No 11, Nov 62, p 57

A new All-Union Design-Research and Scientific-Research Institute, "Energoset'proyekt" for study ofpower generating systems and electric networks has been founded in the USSR. The institute will have the folfowing branches: Northwestern (in Leningrad), Sourthern (in Rostov-on-Don), Ukrainian (in Khar'kov), Siberian (in Novosibirsk), and others.

97. Two Outstanding Soviet Electrical Engineers Die

"Vsevolod Yur'yevich Lomonosov" -- "Professor B. P. Al'bitskiy," by L. I. Sirotinskiy and others; Moscow, Elektrichestvo, No 12, Dec 62, p 88

Doctor of Technical Sciences V. Yu. Lomonosov died on 18 October 1962 at the age of 63. He was lately in charge of the Chair for Theoretical Fundamentals of Electrical Engineering at the Moscow Institute of Electronic Equipment Design. V. Yu. Lomonosov participated actively in the publication of electrical engineering literature as an author, translator, and editor.

Boris Petrovich Al'bitskiy, professor of the Azerbaydzhan Petreleum and Chemistry Institute imeni M. Azizbekov, died on 4 August 1962 at the age of 75. The greater part of his active life was spent in the city of Baku.

High-Speed Photography

98. Two Ultrahigh-Speed Cameras

"4.5 Million Exposures Per Second" Bratislava, Tudomany es Technika, Vol IX, No 12, 4 Dec 62, p 842

Moscow physicists have constructed a so-called "time enlarging" camera which will take from 40,000 to 4.5 million pictures per second. The camera will be used primarily to record high-speed processes such as spark discharges and explosive types of burning.

"10 Million Exposures Per Second"; Prague, Veda a Zivot, No 12, Dec 63, pp 735-736

A camera capable of taking 5-10 million exposures per second has been developed in the USSR. The instrument does not resemble a camera in any way, having the appearance of a hemisphere with a diameter of about one meter. The instrument operates for only 0.00008 of a second, during which time it takes 416 exposures. The film thus exposed takes 26 seconds to show, permitting slow-motion viewing of the phenomenon which has been photographed. The brief period of exposure requires very powerful lighting, which at a given moment is 70 times more powerful than the light of the sun. (FOR OFFICIAL USE ONLY) (COPYRIGHT by the Orbis Publishing House, Prague)

Miscellaneous

99. CPSU Program for Cartography Adopted at 22d Congress

"Tasks of Cartography in the Light of the CPSU Program," by K. A. Zvonarev; Leningrad, Vestnik Leningradskogo Universiteta, No 18, Seriya Geologii i Georafii, No 3, 1962, pp 56-62

The realization of the CPSU Program as regards cartography implies: (1) wider use of aerophototopographic methods combined with automatization of mapping, (2) improved interpretation of aerial photographes, (3) utilization of surveying materials without map compilation, and (4) reduction in the number of scales necessary for different stages of research, planning, and building.

III. CONFERENCES

100. Conference on Air Conditioning Proposed for 1964

"Conference on Air Conditioning"; Moscow, Kholodil'naya Tekhnika, No 6, Nov/Dec 62, p 68

A conference on air conditioning in industrial, public, and residential buildings, organized by the Section on Heat Supply, Heating, and Ventilation of the Central Board of the Scientific-Technical Soveity of the Construction Industry, was held on 15-17 November 1962 in Moscow. It was resolved that the next conference on this subject should be held in 1964 in Tashkent.

101. Session on Urban Electrical Networks To Be Held in 1965

"Fourth Scientific-Technical Session on Urban Electrical Networks," by A. L. Fayerman; Moscow, Elektrichestvo, No 12, Dec 62, pp 86-87

The Fourth Scientific-Technical Session on Urban Electrical Networks, organized by the Kiev and Leningrad Branches of the Scientific-Technical Society of the Power Engineering Industry, was held on 2-6 October 1962 in Kiev. The session was attended by more than 560 representatives if industry, design organizations, and scientific-research institutes. The participants resolved to call the next regular session on this problem in 1965 in Vil'nyus (Lithuanian SSR).

102. Third Conference on Tectonics in 1966

"Second All-Union Tectonics Conference," by O. A. Mazarovich; Moscow, Vestnik Moskovskogo Universiteta, Seriya IV, Geologiya, No 6, Nov/Dec 62, pp 71-73

A report on the Second All-Union Tectonics Conference, held in Dushanbe from 27 August through 1 September 1962, notes that the third conference will be held in 1966 in Vladivostok. The first conference was held in Moscow in 1948.

President of the organizaing committee for the second conference was A. V. Peyve.

103. Conference on Engineering-Geological Mapping

"All-Union Conference on Problems on Engineering-Geological Mapping," by A. I. Belokotskiy and V. P. Bochkarev; Alma-Ata, Izvestiya Akademii Nauk Kazakhskoy SSR, Seriya Geologicheskaya, No 5(50), 1962, pp 120-121

More than 480 representatives took part in the first Soviet conference on problems of engineering-geological mapping of the territory of the USSR, held in Moscow in October 1962. Basic problems discussed at the conference included the principles of engineering-geological regioning, methods of compiling engineering-geological maps of different scales, problems of mapping individual regions of the Soviet Union, and the use of the latest methods in engineering-geological surveying. The use of the formation and lithologic-facies principles of mapping was recommended as being the most progressive. The conference brought out that aerovisual, aerial photographic, and geophysical methods and spectrozonal aerial photography, auger drilling, and penetration probing are being used successfully, while new instruments are under development for radioactive, ultrasonic, radiowave, and microseismic methods of surveying.

Participants of the conference proposed to the State Economic Council and the Ministry of Geology and Mineral Conservation USSR than a main institute of engineering geology be created and resolved that the next conference on engineering-geological mapping will be held in 1965 in one of the cities of Siberia.

104. Recent Soviet Conferences on Engineering and Geology

The conferences listed below were reported or announced in recent issues of Soviet periodicals. Included in the listing are the date and location of the conference, sponsoring organizations, and source. It is assumed that there was no non-Soviet participation in the conferences.

a. Fifth Session of the All-Union Seminar on Pneumatic-Hydraulic Automation; 11-13 June 1962, Leningrad. (Avtomatika i Telemekhanika, Vol 23, No 12, Dec 62, pp 1720-1723

b. Branch Scientific-Technical Conference on Applied Thermodynamics; September 1962, Odessa; sponsored by the Odessa Oblast Board of the Scientific-Technical Society of the Power Engineering Industry. (Kholodil'naya Tekhnika, No 6, Nov/Dec 62, p 67)

c. Fourth Scientific-Technical Session on Urban Electrical Networks; 2-6 October 1962, Kiev; sponsored by the Kiev and Leningrad branches of the Scientific-Technical Society of the Power Engineering Industry. (Elektrichestvo, No 12, Dec 62, p 86)

d. Conference of Workers of Railroad Electrification and Power Supply Services; September 1962, Novosibirsk. (Elecktrichestvo, No 12, Dec 62, p 85)

e. Scientific-Technical Conference on Refrigeration Engineering; 24-29 October 1962, Odessa; sponsored by the Ministry of Higher and Secondary Special Education Ukrainian SSR, Gosplan Ukrainian SSR, the Ministry of Trade Ukrianian SSR, the Scientific-Technical Society of the Food Industry, and the Odessa Technological Institute of the Food and Refrigeration Industry. (Kholodil'naya Tekhnika, No 6, Nov/Dec 62, p 63)

f. Conference on Air Conditioning; 15-17 November 1962, Moscow; sponsored by the Heat Supply, Heating, and Ventilation Section of the Central Board of the Scientific-Technical Society of the Construction Industry. (Kholdil'naya Tekhnika, No 6, Nov/Dec 62, p 68)

g. Second All-Union Tectonics Conference; 27 August-1 September 1962, Dushanbe; first conference held in Moscow in 1948, third to be held in Vladivostok in 1966. (Vestnik Moskovskogo Universiteta, Seriya IV, Geologiya, No 6, Nov/Dec 62, p 71)

h. All-Union Conference on Problems of Engineering-Geological Mapping; October 1962, Moscow; possibly sponsored by the Ministry of Geology and Mineral Conservation USSR; next conference in 1965 in Siberia. (Izvestiya Akademii Nauk Kazakhskoy SSR, Seriya Geologicheskaya, No 5(50), 1962, p 120)

i. Zonal Scientific-Technical Conference on Problems of the Effective Use of Irrigated Lands in the Northern Caucasus and Southeastern Part of the RSFSR; 21-26 August 1962, Novocherkassk. (Gidrotekhnika i Melioratsiya, No 11, Nov 62, p 64)

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Central Intelligence Agency

7 September 2004

Ms. Roberta Schoen
Deputy Director for Operations
Defense Technical Information Center
7725 John J. Kingman Road
Suite 0944
Ft. Belvoir, VA 22060

Dear Ms. Schoen:

In February of this year, DTIC provided the CIA Declassification Center with a referral list of CIA documents held in the DTIC library. This referral was a follow on to the list of National Intelligence Surveys provided earlier in the year.

We have completed a declassification review of the "Non-NIS" referral list and include the results of that review as Enclosure 1. Of the 220 documents identified in our declassification database, only three are classified. These three are in the Release in Part category and may be released to the public once specified portions of the documents are removed. Sanitization instructions for these documents are included with Enclosure 1.

In addition to the documents addressed in Enclosure 1, 14 other documents were unable to be identified. DTIC then provided the CDC with hard copies of these documents in April 2004 for declassification review. The results of this review are provided as Enclosure 2.

We at CIA greatly appreciate your cooperation in this matter. Should you have any questions concerning this letter and for coordination of any further developments, please contact Donald Black of this office at (703) 613-1415.

Sincerely,

Nancy Tatarella for

Sergio N. Alcivar
Chief, CIA Declassification Center,
Declassification Review and Referral
Branch

Enclosures:

1. Declassification Review of CIA Documents at DTIC (with sanitization instructions for 3 documents)
2. Declassification Status of CIA Documents (hard copy) Referred by DTIC (with review processing sheets for each document)

Processing of OGA-Held CIA Documents

The following CIA documents located at DTIC were reviewed by CIA and declassification guidance has been provided.

OGA Doc ID	Job Num	Box	Fldr	Doc	Doc ID	Document Title	Pub Date	Pages	Decision	Proc Date
AD0343932	78-03117A	213	1	18	5117	Scientific Information Report Chinese Science (34)	10/22/1963	89	Approved For Release	3/29/2004
AD0344702	78-03117A	214	1	21	5149	Scientific Information Report Chinese Science (35)	11/4/1963	133	Approved For Release	3/29/2004
AD0344965	78-03117A	215	1	4	5163	Scientific Information Report Chinese Science (36)	11/7/1963	133	Approved For Release	3/29/2004
AD0345229	78-03117A	215	1	23	5182	Scientific Information Report Chinese Science (37)	11/18/1963	179	Approved For Release	3/29/2004
AD0345750	78-03117A	216	1	20	5209	Scientific Information Report Chinese Science (38)	12/11/1963	174	Approved For Release	3/29/2004
AD0344419	78-03117A	217	1	20	5241	Scientific Information Report Chinese Science (39)	12/27/1963	75	Approved For Release	3/29/2004
AD0346493	78-03117A	218	1	21	5277	Scientific Information Report Chinese Science (40)	1/10/1964	115	Approved For Release	3/29/2004
AD0346725	78-03117A	219	1	27	5320	Scientific Information Report Chinese Science (41)	1/27/1964	78	Approved For Release	3/29/2004
AD0347051	78-03117A	220	1	25	5359	Scientific Information Report Chinese Science (42)	2/6/1964	78	Approved For Release	3/29/2004
AD0347849	78-03117A	221	1	39	5407	Scientific Information Report Chinese Science (43)	3/2/1964	174	Approved For Release	3/29/2004
AD0347929	78-03117A	222	1	25	5438	Scientific Information Report Chinese Science (44)	3/5/1964	104	Approved For Release	3/29/2004
AD0348352	78-03117A	223	1	20	5479	Scientific Information Report Chinese Science (45)	3/20/1964	117	Approved For Release	3/29/2004
AD0349491	78-03117A	225	1	18	5560	Scientific Information Report Chinese Science (46)	4/24/1964	118	Approved For Release	3/29/2004
AD0349657	78-03117A	225	1	34	5581	Scientific Information Report Chinese Science (47)	5/4/1964	98	Approved For Release	3/29/2004
AD0332751	78-03117A	183	1	29	3940	Scientific Information Report Electronics And Engineering (22)	10/19/1962	68	Approved For Release	3/29/2004
AD0333146	78-03117A	186	1	20	4041	Scientific Information Report Electronics And Engineering (23)	11/23/1962	73	Approved For Release	3/29/2004
AD0334103	78-03117A	188	1	37	4136	Scientific Information Report Electronics And Engineering (24)	12/20/1962	62	Approved For Release	3/29/2004
AD0334236	78-03117A	190	1	40	4217	Scientific Information Report Electronics And Engineering (25)	1/22/1963	48	Approved For Release	3/29/2004
AD0334769	78-03117A	193	1	39	4339	Scientific Information Report Electronics And Engineering (26)	2/28/1963	68	Approved For Release	3/29/2004
AD0335480	78-03117A	196	1	17	4436	Scientific Information Report Electronics And Engineering (27)	3/21/1963	95	Approved For Release	3/29/2004
AD0336306	78-03117A	199	1	2	4538	Scientific Information Report Electronics And Engineering (28)	4/25/1963	69	Approved For Release	3/29/2004
AD0332433	78-03117A	183	1	35	3946	Scientific Information Report Organization And Administration Of Soviet Science (5)	10/22/1962	60	Approved For Release	3/29/2004